Cement MILL SECTION of

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Asano Portland Cement Company of Japan

By Paul C. Van Zandt

Chief Engineer Asano Portland Cement Co.

浅野セメント株式會社

淺野總一郎氏

Soichiro Asano, President of the Company and Founder of the Cement Industry in Japan.

The story of the rise of the Asano Portland Cement Co. in less than 40 years, from a company operating one experimental plant with a capacity of less than 100 bbls. daily, producing cement from hand made briquettes, to a company successfully operating seven plants in five different localities, pays tribute to Soichiro Asano, the founder of the cement industry in Japan.

Since 1916 the company's program of expansion has included increasing its cement producing capacity from 175,000 bbls. to 600,000 bbls. monthly, a change in daily capacity from 5,800 bbls. to 20,000 bbls. This was a most remarkable venture, especially for a Japanese manufacturer.

Plants have been built and put in successful operation. Starting with the meagre capital at his command at the beginning of his career, Mr. Asano first modernized his original works, and the capital has grown to a present value of $16,500,000. This expansion has been made successful by producing a salable cement at a reasonable cost in the face of considerable foreign competition.

That the plants are modern is evidenced by the fact that two of them contain the first waste heat boiler installations in Japan. Two more large waste heat boiler plants and two more kilns are being built as the result of the unusual success of the first ones.

Mr. Asano's success is not confined to cement manufacturing alone. In the same time during which he has built up the cement industry in Japan, he has developed other undertakings, including the Oriental Steamship Co., with a capital of $16,250,000; the Asano Shipbuilding Co., with a capital of $5,000,000; a steel company, with a capital of $7,500,000; one of Japan's great banks; coal, iron ore and gold mines and a large reclamation project.

Most of the articles written about Japanese industrial plants are by visitors spending only a few days in Japan and writing of what they see with the eyes of an "outsider" so that, when the invitation came to me from Concrete to prepare an article on the new Kawasaki plant, Soichiro Asano, president of this company and founder of the cement industry in Japan, asked that I write this description of what is really one of the greatest industries of Japan as an official article by the "Company" for the benefit of the many friends in America who, through their help to the Japanese engineers whom we have sent there, have contributed so largely to its building.

The story of the beginning, growth and final great success of this company, which would involve the biography of its founder, is romantic in the extreme and I wish it were within my power to show fully the influences of America upon this industry in Japan and to express the full respect and appreciation felt by practically all Japanese business men and engineers for the American manufacturer. Mr. Asano himself and the members of the Asano Portland Cement Co. have been especially anxious to express their gratitude to both the cement manufacturers and the machinery makers of the United States for the unfailing kindness and courtesy that they have shown to our representatives every time they have visited that country. It is greatly regretted that the opportunity to reciprocate does not occur very often as credit is due the American manufacturer for many of the most excellent features embodied in these truly wonderful plants that constitute the largest single cement company in all the world outside the United States.

The Asano Portland Cement Co. was started in 1883 when Mr. Asano, Sr., took over the experimental plant of the Japanese Government, built on the shore of the Sumida river, just outside of the city of Tokyo. This plant then had less than 100 bbls. daily capacity, burning hand made briquettes in a few old German vertical "stack" kilns made of stone and brick. With the meagre capital at his command at that time, Mr. Asano was able to modernize the plant and increase its capacity only through its success in producing a salable cement at a reasonable cost in the face of considerable foreign competition.

His success was continuous from the beginning and the capital grew from a few thousand yen to the present

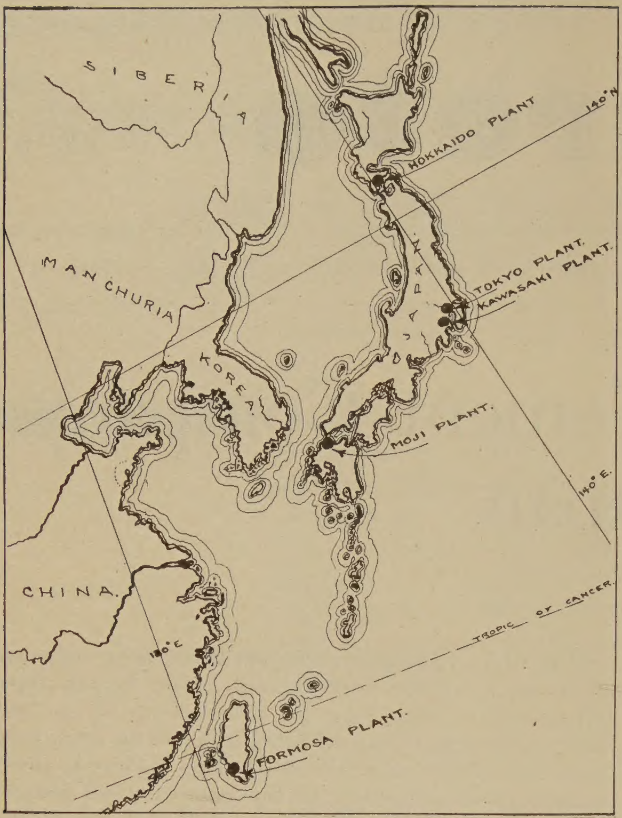


FIG. 1—MAP OF JAPAN AND CHINA COAST, SHOWING LOCATION OF 5 PLANTS
Hokkaido plant is same latitude as New York, Kawasaki plant is same latitude as Memphis and Formosa plant is same latitude as City of Mexico.

sum of 33,000,000 yen or $16,500,000.00 following closely the increased consumption of cement in the Orient. This is all the more remarkable when you consider that he built up at the same time, from even smaller beginnings, such other undertakings as the Oriental Steamship Co. (Toyo Kisen Kaisha) with a fleet of the largest passenger boats on the Pacific and a capital of 32,500,000 yen, the Asano Shipbuilding Co., with ten ship ways and 10,000,000 yen capital, a steel company of 15,000,000 yen with blast furnaces, open hearths, rolling mills, etc., one of Japan's great banks, coal mines, iron ore and even a gold mine. The Kawasaki plant of the cement company is built on a part of thousands of acres reclaimed from the mud flats of Tokyo Bay by a reclamation company of Mr. Asano's and he is the head of several large undertakings in addition to the above and too numerous to mention.

The present Asano Portland Cement Co. consists of seven plants in five different locations, as shown by the map. The oldest of these plants is the Tokyo factory mentioned above, which now has four 6 ft. x 60 ft. rotary kilns making cement from quicklime and clay, the quicklime being burned from the rock in the old German vertical kilns. Tokyo plant has a capacity of

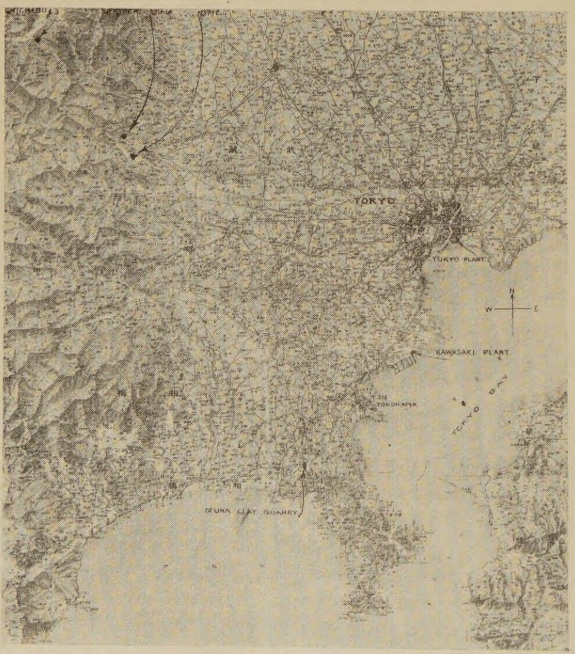
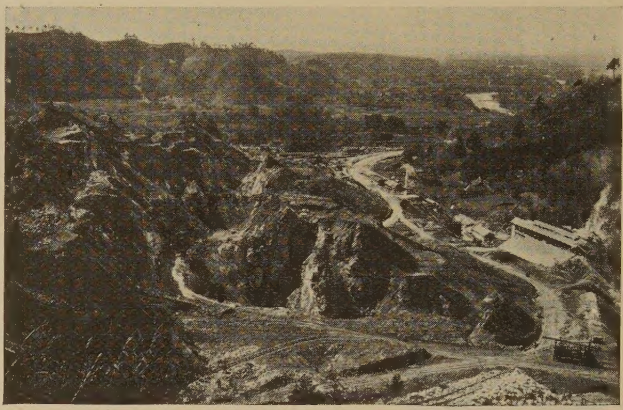
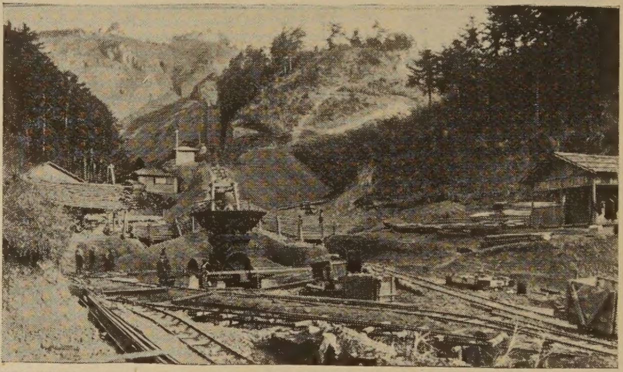


FIG. 2—MAP OF TOKYO DISTRICT, SHOWING LOCATIONS OF TOKYO AND KAWASAKI PLANTS AND THE LIMESTONE AND CLAY QUARRIES AND THE SHIPPING POINTS





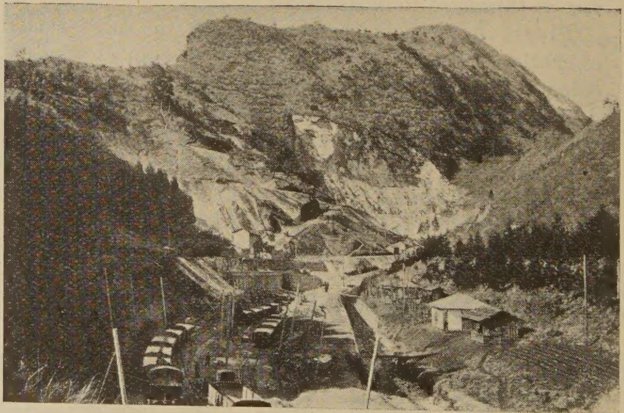


FIG. 3—OME LIMESTONE QUARRY, KAWASAKI PLANT
This quarry supplies rock for Kawasaki and Tokyo plants. Loading pocket in foreground, also well drill.

FIG. 4—RAIDEN YAMA LIMESTONE QUARRY, KAWASAKI PLANT
A new quarry to replace Ome Quarry, which is nearly exhausted. No. 8 crusher in process of erection.

FIG. 5—CHICHIBU LIMESTONE QUARRY, KAWASAKI PLANT
This quarry supplies lime rock to Tokyo, but only part, as the freight rate is higher than Ome.
Quarry excavation is being done by two 35 B Bucyrus revolving steam shovels, caterpillar mounted, equipped with 1½-yard dippers.

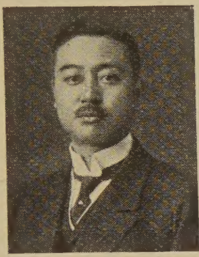
50,000 to 55,000 bbls. per month by this process which we call the "quicklime process." The limestone and clay come from the same quarries as the Kawasaki plant described later. In spite of the fact that Tokyo factory is the oldest and built on a restricted location now entirely surrounded by the business section of Tokyo city, so that expansion is impossible, it has two very modern features, viz., Cottrell system[1] of dust collection by electric precipitation on the kiln stacks and two No. 724 Compeb[2] mills for clinker grinding.

The second oldest plant is the Moji plant, started in 1892 and located on the shores of Shimonoseki Straits, famous in history, and now within the confines of Moji city. This plant is built on a narrow strip of land between the mountain and the sea, has been remodeled and increased several times and now has two 9 ft. x 200 ft., five 7 ft. x 80 ft. rotary kilns and six No. 724 Compeb mills and 150,000 bbls. monthly production.

Hokkaido No. 1 factory is next in age and was purchased from the former Hokkaido Cement Co. in 1915. When first build some years before, it was equipped with Hoffman kilns of German design, consisting of a circle of ovens grouped around a tall brick chimney. At the time of purchase these had been abandoned and two 6½ ft. x 100 ft. rotary kilns of German make had been installed. These are still in use and Mr. Asano added ten vertical quicklime kilns in order to use the same process as Tokyo plant. The plant averages 55,000 bbls. monthly by this process and now a single 9 ft. x 200 ft. rotary kiln and No. 724 Compeb mills of American make have been added making what is called Hokkaido No. 2 factory. The total capacity of both No. 1 and No. 2 factory is 120,000 bbls. per month.

The Formosa plant was equipped with machinery originally purchased to replace the Tokyo factory which was threatened with legal closure in 1913 because of the dust nuisance to the city of Tokyo. At that time it was planned to build a new and very modern plant on the shore of the bay outside the city before shutting down the Tokyo factory permanently. For this purpose three 9 ft. x 180 ft. rotary kilns, eleven Double Hard Mills and auxiliary machinery were purchased from Gebr. Pfeiffer, Kaiserslauten, Germany. This machinery arrived in Japan early in 1914, but in the mean time Tokyo factory was granted an extension to install the Cottrell dust collectors which saved the plant from condemnation and the Japanese Government at the same time was making inducements to its citizens to establish industries in Formosa which had been subjugated and equipped with railways, harbors, and water-power plants since its award to Japan following the Sino-Japanese war.

One unit of the German machinery was therefore installed at Takao, South Formosa, and quick lime kilns added to use the "quicklime" process upon which the cement company holds patents. The Formosa plant was started in 1918. Its limestone is a coral ledge upheaved into a mountain by some prehistoric movement of the earth's crust, and the clay is found in pockets in the ledge much like the raw materials of the Almendares plant at Havana, Cuba. The plant is most modern and has been recently improved by the addition of a Preliminator and Ball-peb Mill on the clinker side and a 500 K. W. steam turbine, all of Allis Chalmers make and a 650 H. P. Edgemoor waste heat boiler[3] plant complete, which has been a wonderful success. The capacity is 55,000 bbls. monthly.



淺野泰治郎氏

Taijiro Asano, Managing Director of the Company and Eldest Son of Soichiro Asano.

S. H. Bates, vice-president of the Bates Valve Bag Co., Chicago, Ill., has just left Japan for home after a trip around the world via England, France, India, China and Japan. He went through China with Mr. Van Zandt last fall. W. M. White, manager of the Hydraulic Machinery Dept. of the Allis-Chalmers Mfg. Co., Milwaukee, has also just returned home from Japan. He made the trip through China in company with Mr. Bates and Mr. and Mrs. Van Zandt.

* * *

Sam Hill, of Seattle (son-in-law of the late Jim Hill), who is famous as a "Good Roads" advocate and a great booster for concrete roads, is in Japan and will return soon as official host to Marshall Joffre, representing the United States Government. Mr. Hill has collected a lot of valuable data on good roads and surely, if very slowly, the concrete roads movement is being introduced in Japan. Mr. Hill has been of very great assistance in this work.

* * *

John A. Roberts, formerly chief draftsman for the Asano Portland Cement Co., in Japan, is now located at Cebu, Cebu, Philippine Islands, preparing drawings for Massey's new cement plant at that place.

The Kawasaki plant, described in detail in this article, consists of two factories side by side and interconnected. The first, called Plant No. 1 was equipped with the two remaining units of German machinery after supplying Formosa, and has since been further improved by the addition of some American machinery as well. It was built at the same time as the Formosa plant.

No. 2 Kawasaki plant was equipped throughout by the Allis-Chalmers Mfg. Co. of Milwaukee, as well as Hokkaido No. 2 and the modern half of Moji plant. The design and building of these new American equipped plants was the first work of the writer upon coming to Japan in 1916.

Kawasaki has a total capacity of 135,000 bbls. by the American dry process, and to recapitulate, the capacity of all plants are:

Tokyo	50.000	bbls. per month
Moji	150,000	" " "
Hokkaido .	120,000	" " "
Formosa ..	55,000	" " "
Kawasaki	135,000	" " "
Total ...	510,000	" " "

There are still two 9 ft. x 200 ft. Allis-Chalmers kilns being installed at Moji factory which, with a few other improvements now being made will bring the ultimate 1922 capacity to 20,000 bbls. daily.

Raw Materials for Kawasaki Plant

The limestone comes from the mountains west of the plant, as shown on the map, and we have three well developed quarries and several large deposits not yet opened up. The oldest quarry is at Ome and here the rock stands in a nearly vertical seam about 150 ft. across and a third of a mile long. The deposit is a deep one but the side walls of the quarry are decomposed serpentine which crumble readily so that the depth of quarrying is strictly limited by the trouble that these side walls cause. Ome quarry is equipped with an Armstrong well

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[1] Western Precipitation Co., Los Angeles, Cal.

[2] Allis-Chalmers Mfg. Co., Milwaukee, Wis.

[3] Edge-Moor Iron Co., Edge Moor, Del.

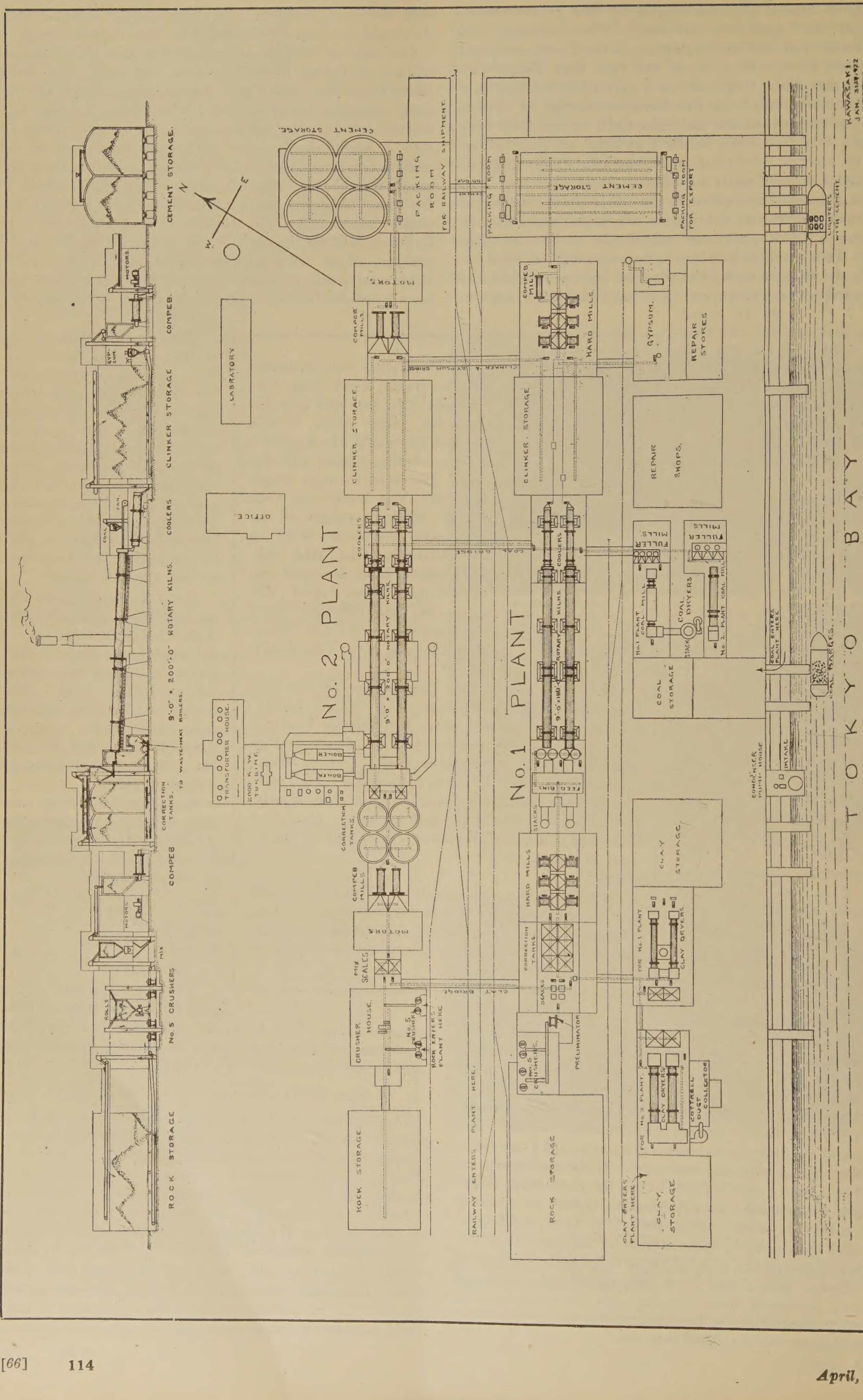


FIG. 6—PLAN AND ELEVATION OF KAWASAKI PLANT

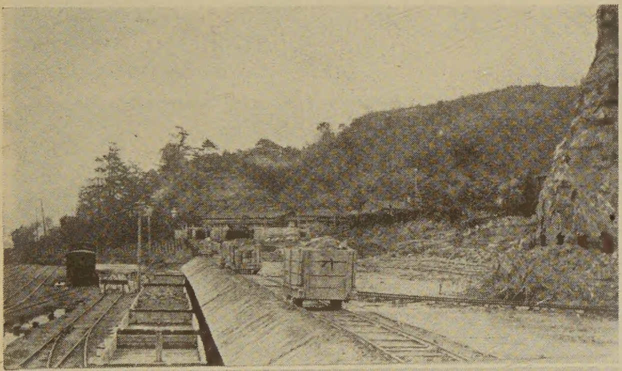
drill[4] for 5 ⅝ in. holes, Ingersoll-Rand Jackhammer drills[5] with air compressor and a large loading pocket over the railway tracks. The life of this quarry is drawing to a close so there is no rock crusher installed, and no room for a steam shovel.

Raiden yama (Thunder Mountain) is half a mile from Ome quarry and has large deposits of limestone on its slopes. Raiden yama quarry cannot be worked to advantage with well drills or steam shovels, but jackhammers are used and the rock loaded by hand. It is lowered to a No. 8 Allis Chalmers gyratory crusher by a gravity incline and the crushed rock is delivered into a loading pocket over the railway by a belt conveyor.

The third developed quarry is on a mountain at Chichibu, equipped with jackhammers and a jaw crusher. This is a fine quarry and serves Tokyo plant in part but being furthest away the freight rate is against it.

The Hokkaido plant has a wonderful quarry which occupies both sides of a mountain valley five miles from the plant site and is equipped with a Bucyrus No. 35 B revolving caterpillar traction steam shovel,[6] a No. 10 Allis Chalmers crusher, Loomis well drills,[7] Ingersoll-Rand jackhammers and air compressor and a five mile 3 ft.-6 in. railway to the plant.

The Moji plant has two quarries, the best being at Kanda, 18 miles away. It is equipped with duplicate shovel, drills, etc., to Hokkaido plant, but the crushing plant consists of an Allis Chalmers Fairmount crusher and a No. 7 Jumbo Williams mill.[8] The rock from all quarries except Formosa is loaded onto railway cars to transport to the plant. At Formosa the plant is built at the quarry.



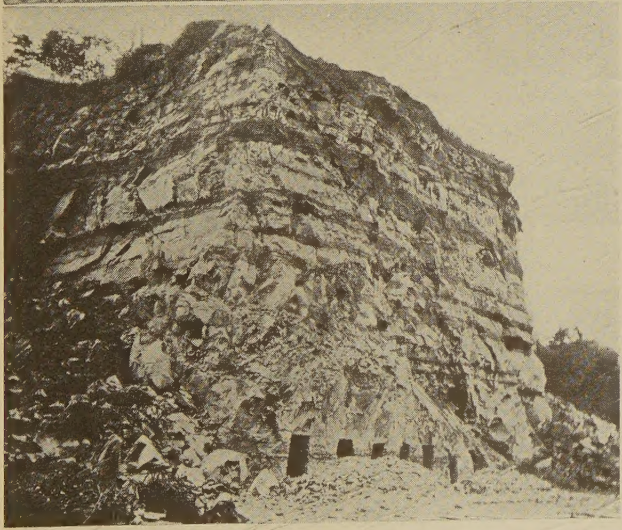


Fig. 7—Loading Platform for Clay Quarry Supplying Kawasaki Plant

Fig. 8—Clay Quarry Ready To Cave

The tunnels are driven first, then the pillars are drawn and the bank caved.

All the limestones used are very pure. The analysis of Ome quarry rock is typical of them all, and is as follows:

$CaCO_3$	97.6%
SiO_2 plus R_2O_3	1.8%
Moisture	0.5%

The clay for Kawasaki plant comes from a hill at Ofuna, a station on the main line of the railway a few miles west of Yokohama. It is a hard, dark gray, non-plastic material and is quarried by cutting tunnels a few feet apart under the bank, then cross-cutting and caving; a type of undercutting on a large scale. The tunnels are cut by hand labor using sharp pointed picks. The clay is then loaded into quarry cars by hand, and dumped into railway cars on the siding and sent to the plant at Kawasaki. There are plenty of deposits of this clay near Yokohama but most of them are too sandy for cement manufacture. The Ofuna deposit is a very excellent one, however, entirely free from sand and of the following average composition:

SiO_2	61.5%	MgO	2.8%
Al_2O_3	19.0%	CaO	4.0%
Fe_2O_3	6.7%	Loss on ig'tn	6.0%

The coal for the kilns comes from both the north island (Hokkaido) and the south island (Kyushu) and both are of fair quality, the average analysis being as follows:

Volatile matter	36%
Fixed carbon	52%
Ash	12%

Heat value about 13,000 B. T. U.

A poorer and cheaper coal is used in the clay and coal dryers and this is mined at Iwaki, about 100 miles north of Tokyo on the main island. It averages about 9,000 B. T. U.

All of the coal comes to Yokohama port by steamship and is trans-shipped to the plant by small sail boats.

The gypsum comes from Sendai district, three hundred miles to the north and is dug from the soil like potatoes. It carries 40½% SO_3 and considerable clay. It comes to the plant by rail packed in rice-straw bags of 133 lbs. each.

EQUIPMENT

The principal equipment in No. 1 Kawasaki plant is:

Dept.	No.	Size	Machine	Maker
Rock.....	3	No. 5	Gyratory Crushers	Allis - Chalmers
	3	No. 85	Preliminator	Allis - Chalmers
Clay......	1	30"x30"	Slugger Rolls	Local
	2	25"x22"	Recrushing Rolls	Local
	2	6'x60'	Rotary Dryer	Gebr. Pfeiffer
Raw.....	6	6'x10'-9"	Double Hard Mills	Gebr. Pfeiffer
Clinker..	2	9'x180'	Rotary Kilns	Gebr. Pfeiffer
	2	6'x60'	Rotary Coolers	Gebr. Pfeiffer
	4	6'x10'-9"	Double Hard Mills	Gebr. Pfeiffer
	1	6'x22'	Compeb Mill	Allis - Chalmers
Coal......	1	6'x60'	Rotary Dryer (indirect)	Gebr. Pfeiffer
	4	33"	Fuller Mills	
Power...			Induction Motors 3 Φ, 50 cy., 3,300 v.	German A. E. G.

The principal equipment of No. 2 plant is:

Dept.	No.	Size	Machine	Maker
Rock.....	4	No. 5	Gyratory Crushers	Allis - Chalmers
	1	54"x24"	Rolls, Anaconda type	Allis - Chalmers
Clay.....	1	30"x30"	Slugger Rolls	Local
	2	25"x22"	Recrushing Rolls	Local
	2	8'x60'	Rotary Dryers	Allis - Chalmers
Raw.....	2	7'x24'	Compeb Mills	Allis - Chalmers
Clinker..	2	9'x200'	Rotary Kilns	Allis - Chalmers
	2	8'x60'	Rotary Coolers	Allis - Chalmers
	2	7'x24'	Compeb Mills	Allis - Chalmers
Coal......	1	6'x60'	Rotary Dryer (indirect)	Local
	3	42"	Fuller Mills	
Power...			Large Motors, 50 h.p. and over 3300 v.	Allis - Chalmers
			Small Motors, under 50 h.p. 500 v.	Local
	2		750 h.p. Waste-heat Boilers	Edgemoor
	1		2000 k.w. Steam Turbine	Allis - Chalmers

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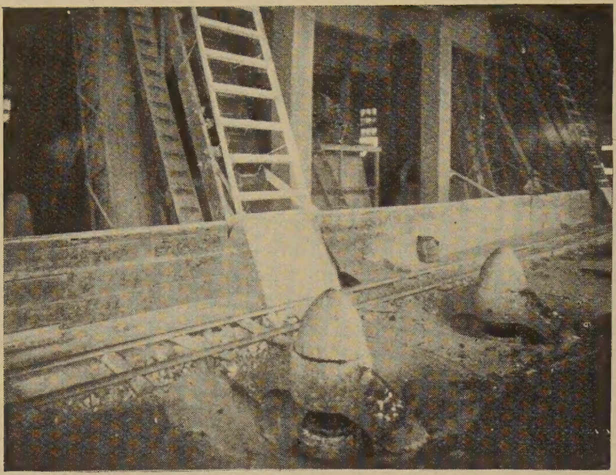
[4] Armstrong Mfg. Co., Waterloo, Ia.

[5] Ingersoll-Rand Co., New York City.

[6] Bucyrus Co., South Milwaukee, Wis.

[7] Loomis Machine Co., Tiffin, Ohio.

[8] Williams Patent Crusher & Pulverizer Co., Chicago, Ill.



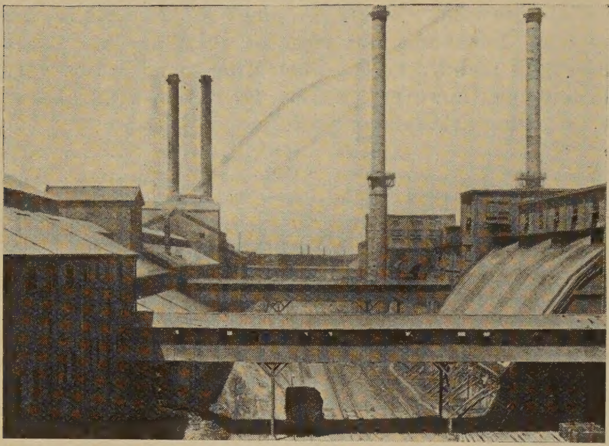


Fig. 9—Four No. 5 Crushers at Kawasaki No. 2 Plant

Fig. 10—General View of Kawasaki Plant, Looking Toward the Rock End from Cement Tanks

Left is No. 1 plant; right is No. 2 plant; clinker, coal and clay bridges interconnect the two plants. Clinker Storage has sloping roof.

All of this machinery has been highly satisfactory. The German machinery was new to the writer who has watched its operation with great interest. The kilns and hard mills were of new design and the kilns especially leave nothing to be desired in excellence. The German design of brickwork for the clay and coal dryers proved to be more expensive and difficult to maintain than the standard American direct heat type, while at the same time the capacity was not nearly so good, so

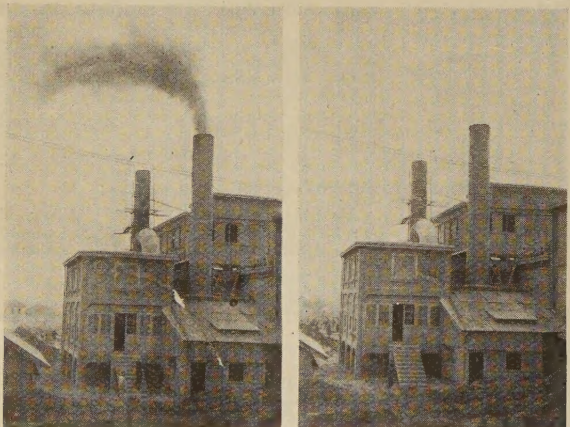
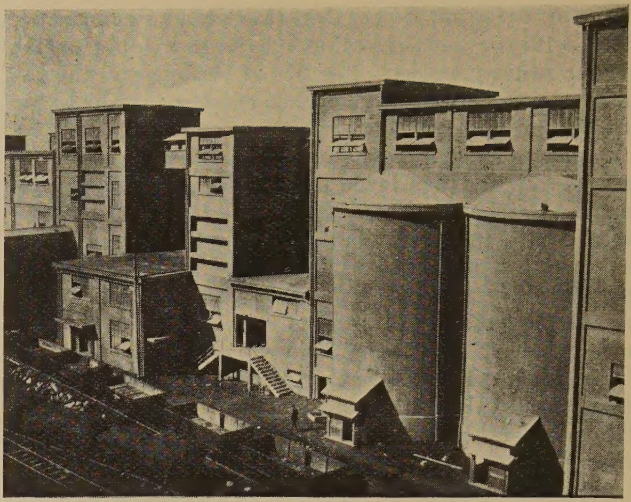
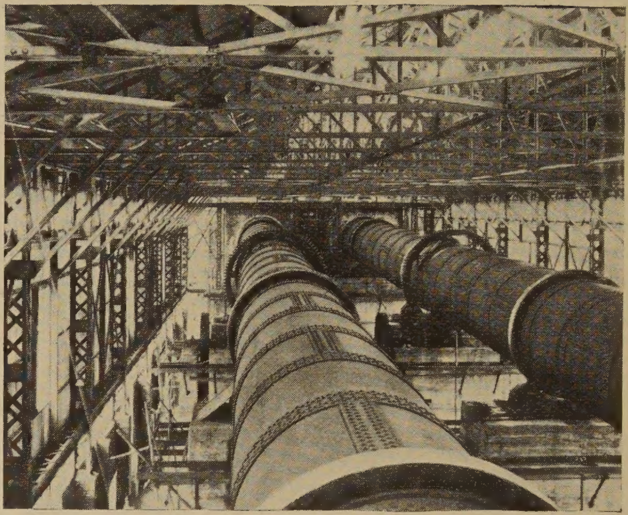


Fig. 11—Left, Clay Dryer Stack, Kawasaki Plant, with Cottrell Electric Current Off; Right, Clay Dryer Stack, with Cottrell Electric Current On





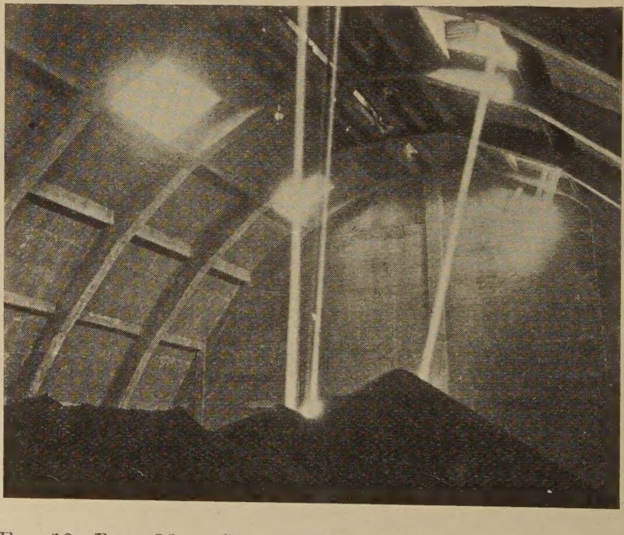


Fig. 12—Raw Mill Side of Kawasaki No. 2 Plant, View from No. 1 Plant

Showing Round Correction Tanks. Building with steps contains two No. 724 Compeb mills; next is feed bin; wide low building is motor room for Compebs; next is mix tank room with clay conveyors entering side.

Fig. 13—Interior View, Showing 9 ft. x 180 ft. German Kilns, Kawasaki Plant No. 1

Fig. 14—Reinforced Concrete Arched Clinker Storage, Kawasaki No. 2 Plant

Interior of Concrete Clinker Storage Building. Sunlight streaming through the dust made the streaks. All the concrete buildings of Kawasaki and Hokkaido are built to the Truscon System and Design, with Truscon reinforcement throughout.

all the dryers in the plant are now arranged the same as the typical American dryer. The coal dryers[9] are somewhat modified Ruggles-Coles type.

The Pfeiffer double hard mill Fig. 23, together with its auxiliary machinery is of sufficient interest to merit a description. It is like a double ended ball mill, but the shell is made of ½-in. steel plate 6 ft. in diameter by nearly 11 ft. long, lined with armor plates bolted in place, and the discharge is through slots in the ½ in. plate at each end of the shell for a foot or so. There is no discharge opening near the middle of the shell. The slots are parallel to the axis of rotation. Each end is a cast steel webbed wheel bolted to the shell and with a feed opening through the hub and a tire on the periphery. The mill is filled 1/3 full of assorted forged steel balls from 3½ in. down to 2 in. It is supported by four rollers like a tumbling barrel, except that the rollers on one side are placed nearly to the horizontal center line, and the two rollers on the other side are nearly under the center of gravity of the combined mill and charge of balls, mounted on a common shaft together with the driving pulley and drive the mill by friction.

The raw material is fed into the mill through the hub at one end by a reciprocating feeder and spout. The product falls through the slots in the shell (and between the lining plates) into a housing encircling the entire mill between the heads, from which it spouts into an elevator that delivers it into an air selector much like the Emerick. The rejections from the air selector are spouted into the mill through the hub on the opposite end from the original feed, hence the name *double* hard

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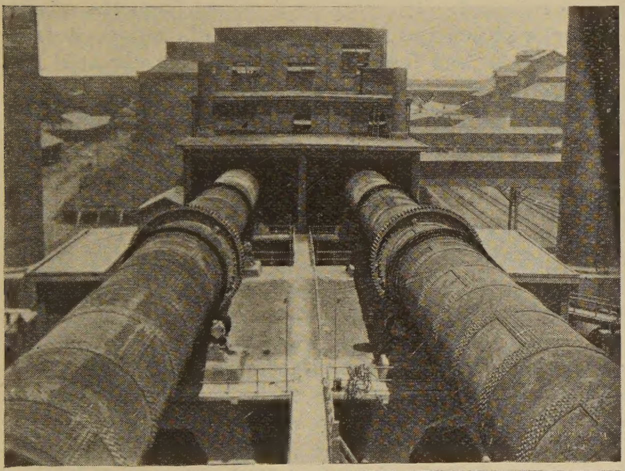
[9] Ruggles-Coles Engineering Co., New York City.



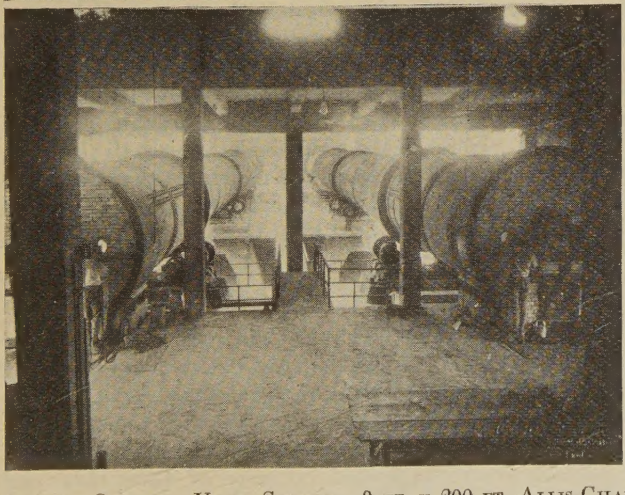


Fig. 15—Outdoors View, Showing 9 ft. x 200 ft. Allis-Chalmers Kilns, Kawasaki No. 2 Plant, Looking Toward Burning Platform

Fig. 16—Burning Platform of Kawasaki No. 2 Plant

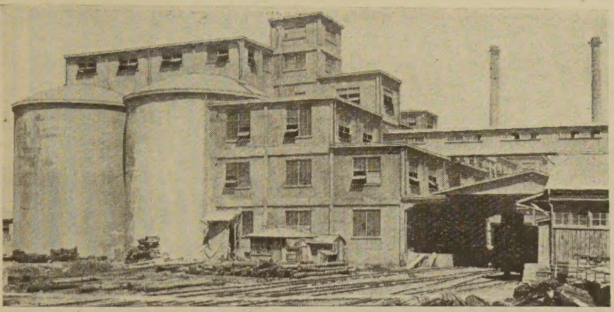
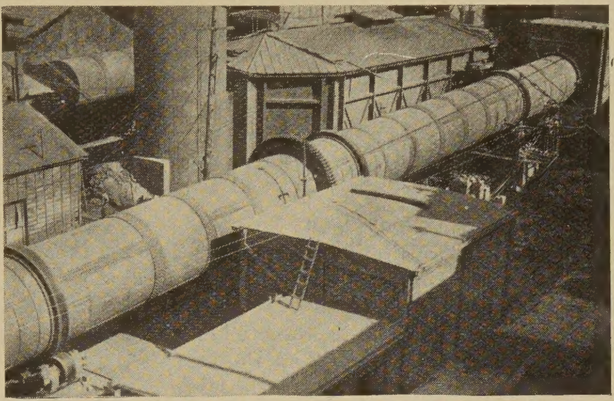
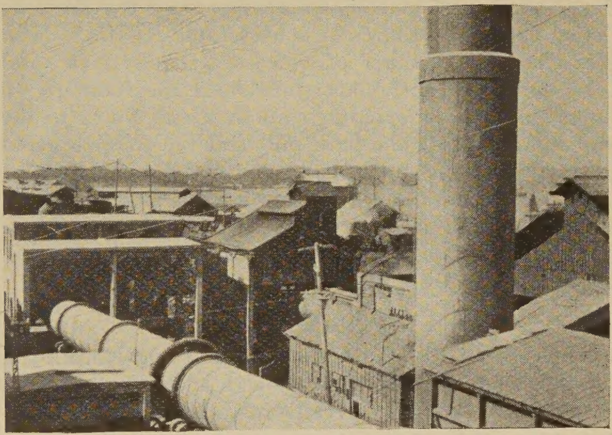


Fig. 17—Reinforced Concrete Cement Storage, Kawasaki Plant No. 2. Cement Stock House, Kawasaki Plant No. 2. Packing Room and Interconnecting Cement Bridge to No. 1 Stock House in Foreground.





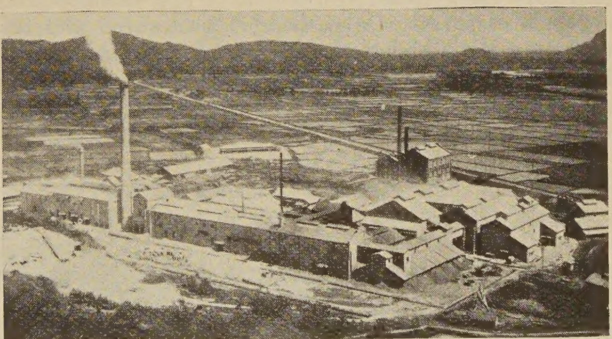


Fig. 18—Moji Plant, New Kiln Looking Towards Feed End
Two of the 9 ft. x 200 ft. kilns. There will be two more added between these two this year, making four modern kilns with Compebs for raw and clinker grinding. Moji is the largest of all the plants, but only a part is new.

Fig. 19—Moji Plant, New Kiln Looking Towards Burning End. Burning Platform for 9 ft. x 200 ft. Kilns
There will be four in all at this plant. The modern construction of the new installation can be readily distinguished from the old plant.

Fig. 20—Formosa Plant, View from the Limestone Quarry
The checkerboard appearance of the country is produced by flooding the rice paddies. A waste Heat Boiler has been added since taking this picture.

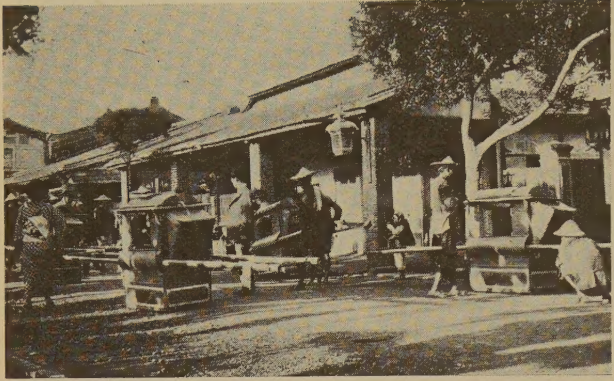


Fig. 21—Quaint Sedan Chair Used in Formosa—the Writer's "Taxicab"

It is carried by three Chinese coolies and is very uncomfortable. You cannot sit up or recline, but travel "hunched up" on your elbows. The coolies jar the chair with every step.

mill as it is double ended. The mill housing is exhausted by a fan that delivers the fine dust into a bag type dust collector.

One mill will grind about 450 bbls. per day 80% through 200 m. or 300 bbls. per day 87% to 88% through 200 m. The mill and auxiliaries can be run by 200 H.P. The actual power record is very good, averaging less than 8 H.P. hrs. per bbl. on the clinker side and if anything, less on the raw side than the clinker. The unit, however, is rather small for such a large plant, making a large number of machines necessary, and the drive by friction has been a source of considerable repairs. Then again the large number of elevators required (a total of 40 in Plant No. 1) also influenced the company to change the type of grinding unit in Plant No. 2 to the compeb mill. Both the hard mill and the compeb grind the material to the finished fineness in one operation.

The writer does not believe there is a dry process plant using coal for fuel that is any simpler, or equipped with fewer, or more reliable machines than Kawasaki No. 1 and No. 2 plants.

Process

The process is the same in both No. 1 and No. 2. The rock which has already been through a No. 8 crusher at the quarry is brought by railway to the plant in side-dump cars (now under construction) and dumped into the No. 5 crushers. From these it is elevated into the Anaconda rolls which reduce it to 3/4 in. and smaller. The product from the rolls is divided, the mill taking its requirements on one belt conveyor and the balance goes to storage on another.

The storage is covered, since we have no rock dryers, and has 7,000 tons capacity. During the intervals between trains the plant draws its supply of rock from this storage. The rock normally carries only about 1/2% moisture and we have no trouble without rock dryers except occasionally when it gets drenched during the worst storms. One man in the tunnel under the rock storage draws the rock onto a belt conveyor that delivers to the elevator that discharges into the rock tank over the mix scales. This tank is large enough to hold rock for 700 bbls. At this plant we are using hopper scales to make the mix and are weighing by hand but at Moji we have just installed a set of Schaffer Poidometers[10] and if they come up to expectations a similar installation will be made at Kawasaki.

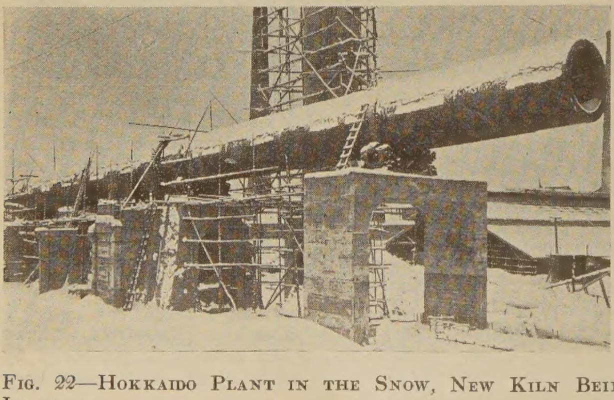


Fig. 22—Hokkaido Plant in the Snow, New Kiln Being Installed

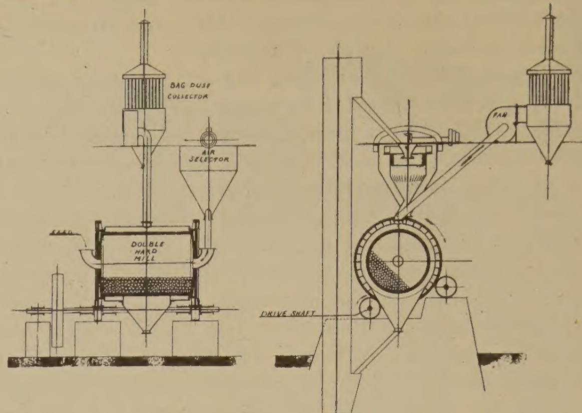


Fig. 23—Hard Mill Installation

The clay is unloaded from the railway cars by hand into a covered storage and from this into the slugger rolls as required. The clay as it comes from the quarry is in large pieces and these slugger rolls reduce it from 24 in. to 6 in. and less. The discharge is elevated and recrushed in the two smaller rolls to under 1 1/2 in., again elevated and fed to the two dryers by reciprocating feeders from feed pockets. The dryers have automatic stokers. The clay, as it comes to the plant, carries about 24% moisture and it is dried to less than 1%. The drying requires about 140 lbs. of 9,000 B.T.U. coal per ton of dried clay. Fortunately the clay is firm and not plastic in the slightest degree, so it is not sticky, but very easy to handle.

The most interesting part of the clay plant is the Cottrell electric dust precipitator for the dryer gases. Each dryer is exhausted by a 48 in. fan and the two deliver the gases into a concrete cyclone dust collector and from this the gases discharge into the Cottrell chamber. The comparative photographs tell the story. It was no easy matter to make this installation a success however, as the gases are almost saturated with moisture and vary from 130° to 160° F. at the inlet of the Cottrell chamber and drop nearly 10° in passing through. It was necessary to put electric heating coils around all the high tension insulators to prevent the moisture from condensing on the cold porcelain and shorting the insulator, and also to ventilate all the conveyors carrying dried clay by box covers and stacks.

The Mix

The mix is made by dumping the rock and clay from the scales into a common hopper below from which it is fed to an elevator by a reciprocating feeder. The elevator delivers it onto a belt conveyor, running over the motor room to the compeb mill feed tanks. These two tanks have a combined capacity of 1800 bbls. and there is no partition between them.

The two compeb mills are each belt-driven by a 450

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[10] Schaffer Engineering and Equipment Co., Pittsburgh, Pa.

H.P. wound rotor induction motor. The power is ample and the two motors together with their big belts and the countershafts and driving pulleys of the compeb mills are all in a room by themselves out of the dust. The installation operates perfectly but future mills will be direct coupled to synchronous motors by magnetic clutches, to improve the power factor of the plant which is now a little less than 80%.

Each mill grinds raw material for 1500 bbls. a day to a fineness of 81% through 200 m. finishing the raw grinding in one operation. The simplicity of this process will be apparent at a glance. The machines are 7 ft. in dia. by 24 ft. long, made of ¾ in. steel plate shell and cast steel heads with hollow trunnions like a tube mill but very heavy. The raw material is fed into one end and leaves at the other through these trunnions, which also form the rotating supports resting in water-jacketed babbitted bearings. The shell is lined with heavy chilled iron bolted liners and the ends with manganese steel. About 6 ft. from the feed end is a manganese steel double partition that permits the material to pass through a heavy grid but keeps the grinding bodies in place. The feed end compartment is filled nearly half full of forged steel balls assorted from 5 in. to 2 in. in dia. and the other end by 1¼ in. round hard iron cast balls. The regular charge is 18,000 lbs. of forged steel balls and 70,000 lbs. cast balls in the raw compeb mills and 20,000 lbs. and 74,000 lbs. respectively in the clinker mills. We have 15 of these mills in operation in our various plants successfully replacing every other type and reducing the number of units to a minimum. There have been no repairs as yet excepting manganese screens and the regular replacement of grinding bodies. This replacement amounts to 21 lbs. forged steel balls and 45 lbs. cast balls per 1,000 tons of materials ground on the raw side.

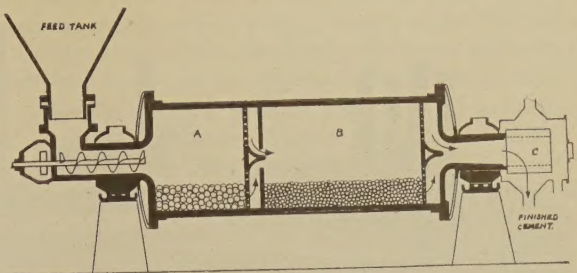

Fig. 24—Compeb Mill Sectional Elevation
A—First compartment with large balls.
B—Second compartment with concavex.
C—Discharge screen.

The mix leaving the compeb mills is elevated and conveyed over four circular concrete blending bins, 30 ft. dia. by 40 ft. high. This mix is sampled and analysed hourly for the mill control and delivered into one of the bins. The diamond shaped space between the four circular bins is also used. There are five feeders under each circular and one under the diamond shaped bin. All of these feeders are kept going slowly all the time so that the material for the kiln feed is drawn from the bottom of all the bins simultaneously. Approximately twice the kiln capacity is thus drawn continuously and the excess overflows from the kiln feed tanks and is returned to the top of the blending tanks and added to the compeb mill product in about equal proportions. The dust from the kiln flues is also returned to the blending tanks continuously with this overflow, with the result that we get almost as perfect and uniform a mix to the kilns as is possible in the wet process. This system has proved so good that it is now being used for blending the raw mix in every one of our plants. The original idea for these blending tanks, or correction bins, came from a similar installation of the Southwestern Portland Cement Co. at El Paso, which is the most perfect the writer has ever seen.

The kilns are set at a slope of ½ in. per horizontal foot and are lined for 50 ft. at the hot end with 9 in. Harbison-Walker fire brick[11] and the balance with 6 in. They have an average capacity a little over 1,300 bbls. per day each, and burn 26% fuel. The installation is out of doors, and the burning platform is cool, roomy and comfortable. It is connected with No. 1 plant burning platform by the coal conveyor bridge.

The kilns in No. 1 plant are under cover of a roof, and give an output of nearly 1,200 bbls. daily each with the same fuel.

The coolers in both plants are below the kilns and extend away from the burning end. The hot clinker drops from the kiln into the cooler through a brick housing, with a dust settling chamber and a stack. At the discharge end of each cooler is a bar screen to separate large pieces of underburned clinker, etc. (usually pieces of a broken "ring"). We have very little trouble from "rings," but are somewhat troubled in holding the lining for about 10 ft. in the hottest part of the burning zone. Underneath each cooler discharge end is a clinker scale so that the hourly capacity of each kiln is automatically recorded.

The clinker, after passing these scales, is elevated and conveyed over the clinker storage. This is covered with a concrete roof supported on eight three-hinge concrete arches and without any posts at all. It holds 68,000

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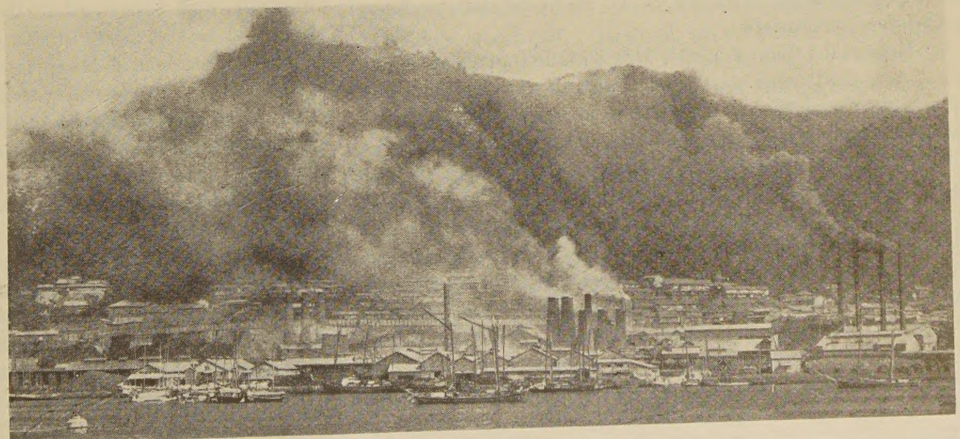
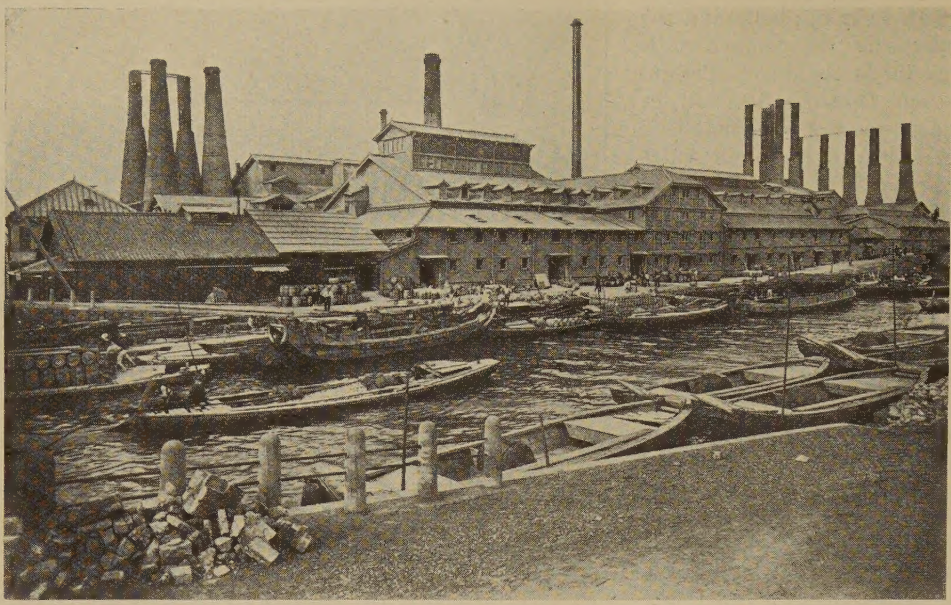
[11] Harbison-Walker Refractories Co., Pittsburgh, Pa.

Early View of Asano Company's Plant at Moji, Kinshu, Japan





An Earlier View of the Main Plant, Tukagawa, Tokyo, Japan.

bbls. clinker, which, if stored outdoors would require redrying in this moist climate. The storage has two tunnels underneath through which the clinker is drawn off on belt conveyors, delivering to two elevators, which in turn deliver to clinker scales over the compeb mill feed tanks. There is a cross belt conveyor connecting the two plants to interchange clinker as required.

The gypsum bags of rice-straw are cut open by hand and the gypsum crushed in a small Gates crusher and conveyed to bins over the reclaiming belt conveyors running out from under the clinker storage. Under each bin is an adjustable reciprocating feeder, driven by a cam like a power punch, and each dump of the automatic clinker scales over the compeb feed tanks trips the cam for the corresponding gypsum feeder, which makes just one measured revolution dumping the 2% of gypsum on to the belt conveyor. The installation is novel, so far as the writer is aware, but works well.

Clinker Grinding

The clinker grinding room is a duplicate of the raw mill, with two 7 ft. by 24 ft. compebs only, and is very simple and satisfactory. Provision has been made in No. 2 plant for two Emerick air selectors,[12] but they have not yet been needed. In the Moji plant we have three 7 ft. by 24 ft. clinker grinding compeb mills, with air selectors, as these air selectors enable us to get as high as 150,000 bbls. per month from a plant that in 1918 produced only 70,000 bbls. with over 50 old clinker grinding machines. These old machines, inherited from previous growth of capacity, were all more than replaced by the three compebs.

At Kawasaki No. 2 plant the finished cement is elevated, weighed, and distributed into four circular concrete tanks (and the diamond shaped interspace as well). The new stock house of the Dewey Portland Cement Co., as illustrated in March, 1921, issue of Concrete, is very much like it in appearance. Ours are each 50 ft. diameter by 50 ft. high, and the entire stockhouse when full holds about 110,000 bbls. cement. The cement is drawn from underneath by screw conveyors in tunnels delivering to an elevator which elevates it into the packing bins. Twice the packing capacity is drawn, and the excess overflows the packing bins and is returned into the top of the cement storage, together with the freshly ground cement, making the same blending arrangement as is used for the raw material. The result has been a remarkably uniform cement for strength, color and setting.

The cement is shipped in both wooden barrels and jute sacks, and by both railway and small boat. The stock house serving No. 1 plant is double ended, one end shipping by rail and the other, being on the bay, ships only by boat. There is a conveyor interconnecting the two stock houses. The small boats are towed, or sail to Yokohama harbor alongside the steamers for export. Three Bates valve bag packers[13] are now being installed for standard ¼ bbl. sacks, and as the demand for sacks increases further it is anticipated that the use of barrels will cease altogether, as it has in the United States. The Japanese consumer has not yet learned to take reasonable care of sacks, and they are frequently torn by the stevedore's hook or dropped from a great height by the ship's tackle or left for days in the rain. Some cement is therefore being shipped in a double sack of jute, with a paper sack of waterproof composition inside.

Coal

The coal comes from Yokohama harbor in lighters, and is unloaded into covered storage by "basket coolies" at present. From storage it is wheeled to an elevator by wheelbarrows and elevated to the coal dryer feed tank. It is all fine enough so that no crusher is needed. It is fed by a reciprocating feeder into the dryer. The dryer is exhausted by a fan and the gases are delivered into a concrete cyclone, which saves most of the dust. The dried coal is ground in Fuller mills[14] in the usual manner, and conveyed to the kiln feed bins, from which it is fed to the kilns in the usual manner.

At Formosa and Moji we have changed the coal feeder to deliver to the suction side of the fan, letting the coal fall through the air for a few inches, being sucked into the suction without any escape of dust. This has produced a beautiful flame, and the operator can see the coal falling into the fan suction and know that the feeder is working smoothly. In case of the feeder flushing, the fan suction will not suck in all the coal and some falls to the floor and the operator is aware of it at once. He has to clean it up afterwards, and as a matter of fact there has been no flushing of the fans so equipped because of close attention by the operator.

The waste gases from the kilns at No. 2 plant are drawn into a common flue that is lined by fire brick and backed by Silocel[15] and covered by sheet iron. This leads directly to two 750 h. p. Edge-Moor boilers with double banks of tubes and four passes. From the boilers the gases pass through a horizontal Green's economizer[16] for each boiler, and are exhausted into one of the original kiln stacks by fans driven by variable speed motors with the control boxes mounted on the burning platform of the kilns. The power equipment includes in addition to the 2000 k. w. Allis-Chalmers steam turbine, a C. H. Wheeler surface condenser[17] with Radojets,[17] Worthington boiler feed pumps[18] and a complete Griscome-Russel feed water evaporating plant[19] with heater. The steam pressure is 200 lbs. with 50° F. superheat. This plant is now ready to start, but not yet in operation. The waste heat plant at Formosa plant was started in August, 1921, and was a great success from the first day. It has one 650 h. p. Edge-Moor boiler and a 500 k. w. Allis-Chalmers turbine. From tests made at Formosa, if we get the same results here we will have a total heat balance in Kawasaki No. 2 plant of 1,400,000 B. T. U. per bbl. of cement produced, exclusive of the quarry and barrel shop. Waste heat plants have been ordered for Moji and planned for Hokkaido, so we should have four installations of 500 k. w., 2,000 k. w., 4,000 k. w., and 3,500 k. w., respectively.

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[12] Rubert M. Gay Co., New York City.

[13] Bates Valve Bag Co., Chicago, Ill.

[14] Fuller-Lehigh Co., Fullerton, Pa.

ORGANIZATION

Since the cement company is a large one, with many plants widely scattered, the personnel is correspondingly large. Furthermore, it is at least twice as large as an American company of equal capacity, since the Japanese, as a race, specialize more than we do and also because the written language and accounting is more cumbersome than English. The ancient custom of all Oriental races to divide a given piece of work among many persons is, however, slowly giving way in Japan under the pressure of modern competition, and every year sees the industrial conditions more nearly approach the Western countries.

Each plant has a general manager, all reporting to the managing director, Taijiro Asano, at Tokyo. At each plant there is a mechanical, electrical, civil and chemical engineer, one of whom is superintendent. These men report to their chiefs at Tokyo, and all have a staff of assistants under them. Each plant has an office manager, sales manager, and purchasing agent, and they are in a sense independent of the head office, while the departments are quite separate and independent of each other. The organization is much looser than a corresponding American one, but functions well and is admirably adapted to the Japanese character and customs. It is entirely Japanese, as is the capital as well. With the exception of the writer and A. A. Doney, chief of erection, only three "foreigners" have been directly connected with the company, all Americans, viz., John A. Roberts for two years, who made the drawings for Kawasaki and Hokkaido No. 2 plants, H. A. Henry for a year on expert kiln operation, and D. Maddox for two years as quarry blaster.

The cement from all plants is not exactly alike, of course, but every effort is made to insure similarity and uniformity as far as possible. Kawasaki cement is as follows:

SiO_2	22.00%	MgO	1.50%
Al_2O_3	7.15%	SO	1.43%
Fe_2O_3	2.45%	Insoluble	0.45%
CaO	63.00%	Loss on Ignition	1.50%

Fineness ....15% on 180m
..........19% on 200m

Setting time by Vicat's Needle: Initial, 2½ hrs.; final, 5½ hrs.

Specific Gravity.............. 3.13

Tensile Strength	7 days	Neat pats	600 lbs.
	7 days	1/3 sand	300 lbs.
	28 days	Neat	720 lbs.
	28 days	1/3 sand	450 lbs.

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[15] Celite Products Co., New York City.

[16] Green Fuel Economizer Co., Beacon, N. Y.

[17] C. H. Wheeler Mfg. Co., Philadelphia, Pa.

[18] Worthington Pump & Machinery Corp., New York City.

[19] Griscom-Russell Co., New York City.

"Cement Fondu"—Alumina Cement[1]

These are some details about this cement as curious from the scientist's point of view, as remarkable for its physical qualities.

It is obtained by fusing in an appropriate furnace a mixture of limestone or lime and bauxite. Its chemical composition, which is essentially different from that of the ordinary artificial cements, is approximately as follows:

Silica	10%
Alumina	40%
Iron and Iron Oxide	10%
Lime	40%

As indicated by the above analysis, its hydraulic index is necessarily high (1.25), and its silica ratio is on the contrary very low (0.25).

The silica is combined with the lime in the form of a di-calcic silicate. The alumina is in the form of a mono-calcic aluminate. As the di-calcic silicate is inert, one sees that the alumina cement owes its hydraulic properties entirely to the aluminates.

The generally accepted theory for a number of years past has been that the hardening and ultimate strength of hydraulic cement was due to the presence of the tri-calcic silicates, the aluminates playing an essential role only at the moment of setting. It would follow, therefore, that the quick setting cements are those relatively rich in alumina, and that the ultimate strength of hydraulic cements was proportional to the content of tri-calcic silicates.

From this it would be expected that the aluminate cements would have an excessively quick set and a very mediocre strength. Instead they have a slow set and a most remarkable strength. Further, the respective proportions of the elements which constitute them may vary within rather wide limits. The opposite is true of other artificial cements, whose composition cannot deviate much from that given by the formulas of Le Chateleir and Newberry, also the properties of alumina cements are not so much effected by the variations in the degree of calcination, which may vary from that just sufficient to cause sintering, to complete fusion, and they can be produced in furnaces of widely different types.

In the works at Tiel cement fondu is manufactured in a water-jacketed furnace similar to those employed in the metallurgy of copper and lead, somewhat modified in detail to meet the requirements of this special manufacture. There is noticeably only one orifice for the discharge of the fused product, which, after cooling, is crushed and ground very fine.

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[1] Abstracted from an article by M. R. Alavène, Secrétaire Général Fédération des Chambles Syndicals des Fabricants de Chaux et Ciments de France—*Science et Industrie*, November 3rd, 1921.

In anticipation of a possible increase in price of fuel, the effect of which would be very marked on the cost of cement fondu, the Société Anonyme des Chaux et Ciments de Lafarge and the Société Electro-Chimie et de Electro-Métallurgie entered into an agreement to experiment on the fusion of the cement in electric furnaces. The putting into actual use of this new process required several tentative trials, but the difficulties were quickly surmounted and the manufacture of fused cement in the electric furnace may be considered as entirely worked out. At the present price of fuel this practice does not give a marked advantage in cost over earlier methods. While it takes relatively few kilowat hours to fuse a ton of cement fondu, the consumption of the electrodes is considerable. Nevertheless, the two companies interested have not given up the electric fusion of the cement fondu and the new works of the Société de Lafarge at Moutiers, in Savoie, will soon be shipping cement fused in the electric furnace. In the meantime, the manufacture in the water-packeted furnace is being continued as in the past, at Le Tiel.

One naturally thinks of applying to the manufacture of cement fondu the rotary kiln, the use of which has so profoundly modified the methods of burning portland cement. The first trials undertaken at the works of Lafarge have not been very encouraging. Other manufacturers are going to repeat the experiments. Is it to be believed that they will not meet with more success?

Cement fondu, in spite of its name, may be made by simple clinkering of an intimate mixture of its constituents, the same as was the cement discovered in America by the scientist, Spackman, about the same time that the service of the laboratories of the Lafarge company at Tiel produced it first by fusion. This is an example of a discovery almost identical made by two investigators at the same time, each naturally ignorant of the other's work. It may be added that Mr. Spackman considered his cement chiefly as a material to be added to other cements to improve their qualities.

Not Decomposed by Sulphurous Waters

The cement fondu so different from cements hitherto known in its chemical composition, manner of manufacture, etc., is further, but nonetheless, positively distinguished in their practical application by two essential qualities. These are the very high early strengths and its absolute indecomposability by sulphurous waters.

It is generally accepted that portland cements do not attain strengths which may be considered approaching their ultimate limit until several months after being placed in the work, and it is only after several weeks that portland cement construction can be put to actual use. This slowness in hardening constitutes in many cases a marked inconvenience. The cement fondu, on the contrary, attains in a few days a remarkably high strength. Twenty-four hours after gauging it gives mortars and concretes more resistant than the best portland cements at the end of a month. Concretes made from crushed granite or basalt, in particular, acquire extreme hardness. On breaking them with a hammer ten hours after gauging, the fracture shows that the granite or basalt is broken as well as the cement fondu. In spite of the ultra rapid hardening, cement fondu has a slow set, which gives all the time necessary for gauging and placing in the work of the mortar or concrete.

From the results of researches recently published in different technological journals, it appears that cement fondu has mechanical properties which will permit of realizing by its use, a notable economy in reinforced concrete construction not only in the amount of cement used, but also in the amount of reinforcing material. This assertion has not been unanimously admitted by all scientists. It is for the future to say how well founded is the opinion that cement fondu will revolutionize the art of reinforced concrete construction.

Be that as it may, the extremely rapid hardening of cement fondu permits at the end of 24 hours the removal of the forms from walls and mass concrete and at the end of three days the removal of forms from columns, girders, slabs, etc., which results in a considerable economy in form lumber.

Rapid Hardening Allows Early Use

An economy of the same order will be found in its use for the manufacture of roof tile, slates, paving blocks and all forms of precast concrete as the molds can be quickly removed and do not have to remain out of use for any length of time. The employment of cement fondu is especially advantageous for all work which must be rapidly put into service, such as pavements, roads, repairs and for marine work which must be executed between two tides. It is recommended for the construction of reservoirs, water pipe, etc., because it gives at the same time a concrete very dense and impenetrable, and one which stands transportation almost immediately after casting.

Certain constructors propose to use cement fondu in the construction of bridges and large arches, and it is being used in the construction of the tidal power plant de Aber-Vrach, near Brest. In one word, the possible uses of cement fondu corresponds with its remarkable mechanical properties.

It possesses one quality no less valuable than all its other characteristics, that is, it is absolutely unaffected by the action of sulphurous waters and sea water, the action of which, on the contrary, is very marked on all the ordinary cements. Concretes exposed to the contact of moist gypseus earth or water carrying in solution sulphates of lime, soda or magnesia, almost immediately commence to disintegrate, indicating the certain destruction with time of the work, no matter how solid its construction.

The causes of this decomposition are well known. They are physical and chemical. The physical decomposition of the mortars is caused by the crystallization in their pores of salts dissolved in the water, which impregnates the concretes. Decomposition is produced in masonry exposed to alternate wetting and drying by the successive crystallization and re-dissolution of the salts, the expansive force of the crystallization quickly reducing the mortars to a veritable mud.

The work of M. Candlot has thrown light on the processes of chemical decomposition. It is due to the formation of a basic sulpho-aluminate of lime formed from the alumina and lime of the cement on one side and the sulphates in solution in the water on the other side. Large crystals of these salts develop in the pores and interstices of the mortars, producing internal strains which cause decomposition.

It is possible to avoid the physical decomposition of mortars if one employs only concretes sufficiently dense to prevent all penetration of the masonry by water but investigators have searched vainly for a number of years past for a cement which would be actually unaffected by sulphates.

With the Cement Fondu it is impossible for the reaction necessary for formation of basic sulphates of alumina to be produced because the content of lime and alumina are practically equal. To repeat in short, Cement Fondu is indecomposable because its hydraulic index is very high and because its hardening is not accompanied by the liberation of lime. The indecomposability, which is a logical consequence of the constitution of Cement Fondu, has been put beyond question of doubt by experiments carried on in the Lafarge laboratories since 1908 where cubes of lean mortar have been immersed in a saturated solution of sulphate of lime and in solutions of sulphate of magnesia containing 18 grams per liter. The second solution is particularly active. Numerous other cements at the end of a few months show indisputable signs of decomposition. Nothing of the kind is observed in the Cement Fondu which shows itself radically rebellious to the action of decomposing solutions. These results have been confirmed by tests undertaken under the direction of M. l'ingenieur Séjourné near the tunnel on the line between Nice and Coni. In view of determining the degree of indecomposability of the various cements proposed for this work where particular precautions were needed owing to the large percentage of anhydrous sulphate of lime present in the earth, a test particularly hard, was made as follows:

Cubes of mortars, the aggregate of which consisted in equal parts of sand and crushed anhydrous sulphate of lime, were immersed in a stream of very sulphurous water. Of all the blocks so tested only those made from Cement Fondu were without trace of decomposition. As a result of these tests the employment of Cement Fondu is specified for all parts of the line where the cement will be in contact with sulphur carrying waters.

Indecomposability of a cement is a very valuable quality, Gypseus earths are unhappily not the exception and water, containing sulphates, the most active agent in the decomposition of mortars, are frequently encountered and the importance to the cement industry of the invention of a cement which is not only indecomposable but in addition acquires in a few hours very high resistance, is evident.

Cement Firms Indicted by U. S.

Twenty-six corporations, manufacturing cement in the Middle Western States, and 48 individuals, officers of the companies, were named in an indictment, charging violation of the Sherman anti-trust law, which was returned by the federal grand jury March 8, but was not made public uutil Tuesday night, after bench warrants had been served on the individuals, according to Associated Press reports.

Charging that the law governing interstate traffic has been violated, the indictment alleges that the 26 companies have conspired to regulate the cement business in Ohio, Indiana, Michigan, Illinois, Kentucky, Iowa, Missouri, Wisconsin, Minnesota, Nebraska, North Dakota, Pennsylvania, South Dakota, Tennessee and Arkansas. It further states that 25,000,000 bbls. of cement are made by the companies annually, which is 90% of the amount manufactured in the Middle Western States, and 25% of the entire output of the United States.

List of Concerns

There are eight counts in the indictment, charging a combination in restraint of trade, conspiracy and a violation of the Sherman anti-trust law. Among the concerns named are the Lehigh, Aetna, Alpha, Atlas, Cape Girardeau, Castilla, Continental, Crescent, Diamond, Huron, Indiana, Kosmos, Michigan, Newago, Peerless, Peninsular, Universal, and Wolverine portland cement companies, the Marquette Cement Manufacturing Co., and the Wellston Iron Furnace Co., and the Sandusky Portland Cement Co.

List of Individuals

The following individuals are named in the indictment: A. Y. Gowen and E. H. Rader, of the Lehigh company; Oscar J. Lingeman, of the Aetna company; G. S. Brown, Charles A. Irvine, W. E. Vites and A. M. Fellows, of the Alpha; John R. Morron, D. H. McFarland, and I. W. Lewis, of the Atlas; C. L. Harrison and W. S. Fischer, of the Cape Girardeau; George W. Hackett and W. W. St. Clair, of the Castalia; David A. Marks and J. B. Turpin, of the Continental; David M. Kirk, of the Crescent; Lyman A. Reid, of the Diamond; John W. Boardman, of the Huron; Adam L. Beck, of the Indiana; Charles Horner and C. M. Clark, of the Kosmos; T. G. Dickinson, William Dickinson, R. B. Dickinson, and E. A. Dolen, of the Marquette; M. S. Potter, of the Michigan; W. M. Hatch, of the Peerless; John L. Senior and A. C. Deer, of the Peninsular; P. H. Newberry, E. J. Maguire, and C. B. Rogers, of the Sandusky; B. F. Affleck and Blaine S. Smith, of the Universal; S. E. Stephenson, of the Wellston Iron Furnace Co.; S. H. Jones and P. H. Sweeney, and W. E. Cobean, of the Wolverine.

Asano Company Installs Weightometer

A Merrick Conveyor Weightometer has been installed by the Asano Portland Cement Co. in Japan for weighing finished cement.

The Weightometer, manufactured by the Merrick Scale Mfg. Co., Passaic, N. J., finds broad use in the cement field or any place where it is desired to weigh automatically and record the weight of material passing in transit over a belt, bucket or pan conveyor. The mechanical weighing is accomplished by the equipment carrying a portion of the moving belt suspended from its levers. The weightometer is driven by sprockets and chain from the return side of the belt and automatically totals the weight upon a continuous counter that eliminates the services of a weighman.

Hudson Valley Company to Use Wet Process

The Hudson Valley Portland Cement Corporation was incorporated in December, 1921, and purchased the properties of the Alsen Cement Co., of America, Inc., at Alsen, Greene County, New York. W. J. Fallon, president of Tyson Co., Buck Ridge Coal Mining Co., Continental Credit Corporation, and who is interested in various other large enterprises, is the president of the company.

Extensive alterations and additions are being made, including the installation of the most modern grinding and other equipment in the quarry, raw grinding and finish-grinding departments. The most radical change being made is from the dry process to the wet process. Raw materials are quite variable and the wet process will insure an absolute uniform product and closer chemical control. The engineering work is being carried out by Ellis Soper, who will also place the plant in operation. When the work outlined is completed, this company expects to have the most modern mill in the Hudson Valley district.

The company will put the first unit of 1500 barrels into operation the first part of, and the second unit about the last of April. The third unit will be installed early in the summer. Waste heat boilers will be installed in the spring, and the company will begin operations with contracts for practically its first year's output. The product will be marketed under the brand of Storm King.

Discussion of Grinding Equipment

A Letter from Harlowe Hardinge

The discussion in Mr. C. O. Sandstrum's article, entitled "Discussion of Grinding Equipment," in your December issue, might well be taken to heart by manufacturers of cement mill equipment.

His comments are apropos and outline the failings of practically all manufacturers in trying to juggle statistics in a manner that will react to their benefit. This statement of mine may seem peculiar inasmuch as I also have to do with the manufacture of cement milling equipment and our company has undoubtedly been accused of the same failing, but this does not alter the fact that a recognition of failings tends to alleviate our shortcomings.

Several years ago, with the radical change that was made in the class of metallurgical and grinding equipment in the mining industry, there was a great deal printed pro and con of the different systems. Some of the discussions became pretty warm and the final wind-up showed that it did the manufacturers more harm than good.

If the cement mill machinery manufacturers could only profit by the experience of the manufacturers of mining machinery, they would benefit in the long run, but I doubt if such would be the case, for we all have to learn by our own experience rather than take advantage of that which is available, but which we are not big enough to see applies to us as well.

Mr. Sandstrum mentions that he has talked with representatives of cement grinding machines, and each one states that his is the best for the particular purpose at hand. He asks the question, "If any grinding machine is vastly superior to all others, the question is then forced upon one, Why are not all cement plants equipped with that machine?" He answers that there is no such superiority. With this we take exception, for of all the makes and classes of grinding equipment on the market, there must be one which is superior to the others. Whether this one is the best in other departments is another matter.

One reason we give for the fact that there are so many classes of grinding equipment in the cement industry is that there are a number of manufacturers in the business with radical types of equipment, all concentrating their sales energies on a relatively few plants, while others are concentrating theirs in other directions. Hence, one type of machine which may be relatively inferior would be installed in a number of plants where concentration on the part of the manufacturer was most keen.

Another reason is the fact that very seldom do cement mills install competitive equipment on a trial basis or in a test plant in order to determine which type is the best for the conditions under which they operate. In the mining industry, especially the porphyry coppers, where a saving of 2c or 3c per tons means a considerable fortune at the end of the year, the large companies install competitive units of grinding mills in testing plants of sufficient size so as to determine without question the superiority of the different machines for the particular work at hand. After a run of anywhere from six months to a year with the different classes of equipment operating under identical conditions, they make their decision and then build the main plant accordingly.

It is true that some mining companies select one type of machine, while others select another. One may not have tried out the particular device which was selected by another company, or the character of the ore and the method of operation may be different in one case; therefore, the equipment chosen may differ.

In the cement industry, however, the variation is nowhere near as great as in the mining industry. While limestone and clinker both differ in hardness and grinding characteristics, still they are ground to almost the same fineness by each manufacturer, and hence, one of the greatest variables is eliminated.

The ideal way for the cement manufacturer to determine which is the best class of grinding equipment, and therefore reduce his operating cost, would be to erect a test plant, and there install one commercial sized working unit of each type of equipment which is claimed to be the most efficient, and then run tests, not for two months, but for six months to a year, thus determining not only the operating characteristics and power required, but the endurance and ability to withstand wear under severe operating conditions.

Now, with regard to wet versus dry grinding. Our company should be in a good position to say a few words, as we have no "axe to grind," inasmuch as the Hardinge conical mill is used as much on dry grinding as it is on wet and we have had as much to do with the different problems of grinding dry as wet, and it makes little or no difference to us which the operator desires, except as it affects the general economy throughout his plant.

In wet grinding it is found that the capacity through the mill is slightly increased over that of dry. The power required for a given mill is a little more for dry than for wet, hence, the net result shows that the power per ton of limestone ground through a given mesh is somewhat less for wet than dry grinding, all other conditions being equal. On the other hand, when grinding wet, there is more wear on lining and balls than when grinding dry. The lining of a wet mill lasts between two and three years, that of a dry mill from six years upward; in fact, we have little information on the real cost of the lining per ton of limestone ground, as the wear is so slight that the information we have is not sufficient to form any definite comparison. As far as the ease of handling is concerned, wet grinding is superior to that of dry, and certainly the wet grinding plant is cleaner and healthier than the dry.

With these facts in mind, the decision should then be made from other considerations than grinding, for the cost of grinding wet as against dry does not vary to an extent which would be the deciding factor in itself.

The investigation of dolomite cements will be continued at Columbus, Ohio, by the Bureau of Mines. Free lime in dolomite cements, calcined above 800° C., causes excessive shrinkage and cracking in the finished cements. Dolomite cements, containing practically no free lime, may be prepared by calcining the rock at a sufficiently low temperature (below 800° C.) to decompose the magnesium carbonate but not the calcium carbonate. The investigation will consist of calcining dolomite at a temperature high enough to decompose both the magnesium and calcium carbonates and adding suitable agents to react with the lime. By such a procedure the troublesome effects of free lime are neutralized and the cementing properties of the lime can be used to advantage.

Heat Efficiency Increase In Cement Burning

By C. E. Burgoon

The preheater for cement compound described by H. Larmour and W. C. Stevenson in their article on Heat Efficiency Increase in Cement Burning, which appeared in the December, 1921, issue of the Cement Mill Section of Concrete, appears very attractive from the design and a hurried reading of the article. However, in making the computations relative to the increase in capacity and saving in fuel one essential point was overlooked, namely: the heat capacity of the compound.

The computations indicate that 91,000 B. T. U. are transferred from the stack gases to the compound per minute. The kiln has a capacity of 16 bbls. of cement per hour or approximately 1 bbl. in 4 min., which gives 91,000 × 4 = 364,000 B. T. U. absorbed by the compound per barrel of cement. It requires approximately 600 lbs. of compound per barrel of cement. The compound has a specific heat of two-tenths (.2) and will absorb 600 × 0.2 = 120 B. T. U. per degree rise in temperature or, if the compound absorbs 364,000 B. T. U. per barrel of cement, its temperature will be raised 364,000 ÷ 120 = 3,030°. The gases enter the preheater at 1,400° Fahr., therefore the temperature of the compound leaving the preheater would be slightly less, which indicates that only a small per cent of the heat in the stack gases can be transferred to the compound.

The gases will leave the decomposition zone of the kiln at not less than 2,000° Fahr. and the compound should enter the decomposition zone at about 1,600° Fahr. If the compound enters the kiln at 70° Fahr. it will require 600 × 0.2 × (1,600 — 70) = 183,600 B. T. U. to raise its temperature to 1,600° Fahr. per barrel of cement. There are 550 lbs. of stack gases per minute or 550 × 4 = 2,200 lbs. per barrel of cement. The gases have a specific heat of .24 and will release 2,200 × .24 = 528 B. T. U. per degree decrease in temperature per barrel of cement. Neglecting radiation, the decrease in temperature of the gases on account of heating the compound will be 183,600 ÷ 528 = 350°, or the temperature of the bases leaving the kiln will be 2,000 — 350 = 1,650.

The two preceding paragraphs indicate that in the *dry process* only a small per cent of the heat in the gases leaving the decomposition zone is absorbed by the compound and that there is not any need for a preheater. In the *wet process* the compound could not be heated above 212° Fahr. unless an exit was provided for the escape of steam generated in the preheater.

Considering the successful operation of waste heat boilers in connection with cement kilns it appears that there is not any place for a preheater in a modern cement plant. In a plant using the *wet process* a dewatering plant would increase the available boiler horse power as well as the heat efficiency of the plant.

Work is to be continued by the Bureau of Mines in dead burning dolomite for refractory purposes. In previous work dolomite brick were made which stood 6 mos. storage in open air, after which they disintegrated. The new work will consist of using highly aluminous fluxes in order to make a more stable product. Experiments in treating the fire brick by soaking them in sulphate solutions will be undertaken, thus converting the uncombined lime to the more staple calcium sulphate.

Progress at Signal Mountain Plant

By T. A. Rogers

Work on the excavation of the future home of the Signal Mountain Portland Cement Co. is being rushed. There are at the present time 25 teams at work, together with about 100 men and a steam shovel. A sawmill has been erected on the company's property to cut into dimension timbers and boards the trees which are being cleared from that portion of the site on which the plant will be located.

A. C. Deer, general manager of construction, has established an office at the works, where all problems of engineering are disposed of. It is new work coming at a time when work is needed. The company is carrying a payroll of approximately $300 daily.

The reports of the U. S. Geological Survey as to imports and exports of cement are referred to to contradict the reports of demoralizing imports into the United States. It is cited that Richard Hardy, of the Dixie Portland Cement Co., is in Europe at the present time, studying conditions in this line of industry. Mr. Hardy stated before he left the United States that, in his opinion, this country faces the keenest period of competition the industry has ever known. Mr. Hardy further declared that unless the congress of the United States passed adequate tariff protection for the industry, based on the American plan of valuation, a serious condition would result within the next twelve months, unless drastic measures to cut production costs in this country were taken at once.

It is pointed out that coal is the principal factor in the manufacture of cement. It is also pointed out that during the past few months large shipments of coke from Germany have been laid down on the Pacific Coast, at less than it was possible for American manufacturers to deliver the product at the same points.

The belief is that the great part of these coke shipments were in ballast. It would be an impossibility to transport any great amount of cement in this fashion, due to the probable action of water and leakage of the bottom.

Officials of the Signal Mountain company, commenting on this statement, said that even though it were possible to land cement in this country from German points, the effect could not be felt other than on the coast, due to the overland transportation rates.

The coming year it is held will be a banner one for the cement industry. Road contracts in all parts of the country are being let, and general construction is on the upgrade.

Michigan Will Buy Cement Direct

The Michigan Administrative Board approved the plan of Frank F. Rogers, state highway commissioner, for the state to buy cement for road construction this year direct from the manufacturers. Mr. Rogers reported that this would save the state approximately $200,000. Cement can be bought by the state at 10 cents a barrel cheaper direct from the manufacturers than the contractors can purchase it. Another 10 cents a barrel would be saved as a cash discount, providing bills are paid in 10 days. Michigan will use 1,000,000 bbls. this year.

Cement Industry in Canada[1]

By F. P. Jones

Canada Cement Co., Ltd.

Raw materials are plentiful, but the price of coal remains abnormally high, this is accounted for because miners' wages have not been reduced as other wages have, because the profit on a ton of coal is much greater than it used to be; and because of the high cost of transportation from the mines to the point of consumption.

The efficiency of labor is much better than it was. In some industries costs have come down, although labor is still high compared with pre-war prices.

The trend of prices of finished product during the year has been downward, but has not yet reached rock bottom, nor can it reach rock bottom until the price of coal and transportation is greatly reduced.

Business in the writer's opinion can never be normal with the price of wheat, oats, etc., as it is today. The former, or the bulk of Canadian people cannot have a proper purchasing power until the cost of coal, freight rates and other things which are abnormally high are reduced to the same level of farm products. In other words, if ten bushels of wheat prior to the war would buy a pair of boots, a suit of underclothes and a hat, today they would only buy a pair of boots!

The writer does not think the worst is over, because, as above stated, the price of farm products must go up or other commodities must come down, and until the differences in price are equalized, there can be no prosperity or contentment in the country.

If a mechanic works for a railway company he probably gets a dollar an hour; if he works anywhere else he probably get forty cents an hour. Therefore, how can mechanics who are not fortunate enough to be employed by the railway be content?

Canada suffers more by high railway costs possibly than any other country on account of our great mileage and few persons to the mile. The only relief the writer can see is for the government to let the same conditions govern railway workers as any other Canadian citizens, and rail rates must come back to some reasonable advance over pre-war prices before the farmer or any other citizen of Canada can enjoy any prosperity.

By John G. Lind

St. Mary's Cement Co., Ltd.

Prices of raw material are gradually coming down, and I believe have about reached bottom; and the supply is regular.

There has been an ample supply of labor of all kinds. Efficiency has gone up about 20% over that of last year. We have not, as yet, reduced wages, and with the increased efficiency, it may not be necessary.

The market for cement last year was quite satisfactory, until the first of November, when it suddenly slumped.

The general tendency in prices, as far as we are concerned, has been downward, and we consider that the decrease in price for the year 1921 was about 25% less than 1920. I believe the process of deflation has been almost completed, as most goods are being sold now on a close margin.

With a low class commodity such as ours, freight rates influence the price tremendously. The average increase in freight rates on our commodity is about 90% since 1916.

The outlook for business in 1922 appears to me to be very encouraging, and I believe we will be able to dispose of all that our plant can produce. I believe, by March, there will be a slight improvement in all lines.

Ship Canal Cement Manufacturers

Speaking at the 10th annual general meeting of the Ship Canal Portland Cement Manufacturers, Ltd., held on December 30 last, at Ellesmere Port, G. A. Watson, who presided, referred to the completion of a new plant which was coming into commission, according to information from England. Regarding the demand for cement, he said the large capacity of the works could not yet fully be taken advantage of owing to current trade conditions. Referring to the product, carbo limo, Mr. Watson described carbo limo as the highest grade carbonate of lime from their own quarries and pulverised by special machinery in their own works. They could produce 2,000 tons of carbo limo per week, in addition to a full cement production and, furthermore, owing to the interchangeability of the operating arrangements, 6,000 tons of carbo limo could, if necessary, be produced along with 3,000 to 4,000 tons and upwards of cement per week. The potential demand for carbo limo for agricultural purposes alone was prodigious, and the directors believed that a fair demand would quickly eventuate, particularly at the low price at which they were now able to sell, coupled with their propaganda and the propaganda of the Ministry of Agriculture to impress on the country the necessity of making up the deplorable deficiency now existing in the liming of the lands of the country.

Continuing, Mr. Watson said he hoped to induce other manufacturers to work in conjunction with the company, so that the production of carbo limo could be zoned in different parts of the country, so reducing the cost of transit to the minimum. Carbo limo had many other uses, such as a filler for asphalt, a component part of fertilisers, etc., and these sources of demand the company was now in the position to develop. The Board of Trade made an order under the Coal Mines Act of 1921 and subsequently regulations making it compulsory to dust all metalliferous mines to obviate explosions. The company had found that carbo limo fully complied with the Board of Trade requirements, and consequently they were supplying this material under the trade name of Davy Dust to colliery proprietors for that purpose.

Danish Cement for Mexico

Danish cement manufacturers are developing a market in Mexico, according to a report from Consul General Marion Letcher, at Copenhagen, to the Department of Commerce. The East Asiatic Co.'s steamship Natal took a shipment of 10,000 bbls. of Danish cement for delivery at Mexican ports in December. This was the third of this company's steamers to leave Denmark with cargoes of cement for Mexico. The first, the Transvaal, took a shipment of 2,000 bbls. in September, and this was followed by the Tranquebar in October with 4,000 bbls. These vessels call in Mexico at the ports of Progress, Vera Cruz, and Tampico. Consul General Letcher reports that the East Asiatic Co. is considering the extension of its transportation service to west Mexican ports, if the present venture proves satisfactory. This line to Mexico was inaugurated last September. It is understood also that the Mexican government is expected to grant these vessels exemption from port dues to further the extension of this service.

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[1] Abstracted *Industrial Canada.*

Cement Mill for Jamaica

The proposal for the establishment of a cement mill in Jamaica by the government of the island is not believed to be feasible at this time, according to a report from Consul L. L. Lanham, at Kingston. It is not likely that the project will be introduced at the next session of the Legislative Council, but if it is introduced sanction for its construction probably will be withheld. Abandonment of the scheme is believed to be only temporary, and is due to the precarious financial condition of the island, and the desire of the government to reduce expenditures. A certain amount of local opposition toward the government's undertaking of commercial enterprises also has found expression recently.

Cement in New Zealand

A LETTER FROM T. H. WILSON

WORKS MANAGER WILSON (N. Z.), PORTLAND CEMENT, LTD.

The cement situation in New Zealand has been fairly satisfactory during the last 12 months. Early in 1921 all the cement companies were busy but at the end of April the finances of the country were somewhat strained, as the staple products, namely, wool, mutton, beef and butter, took a heavy fall. Consequently the public purse strings were tightened and trade fell, so that one of the cement companies closed down.

Trade revived again during September and continued very satisfactory until the end of the year.

All thought of plant extensions was abandoned, but it is hoped that the turning point is not far distant when public works will again be forging ahead and a sufficient demand for cement be created to warrant carrying out our program of a year ago. At that time plans were in hand to add a kiln 190 ft. x 9 ft. x 8 ft., with the necessary grinding equipment.

Wusih Cement Works

A new enterprise for Wusih has been launched, according to *China Review*. A company has been formed for the manufacture of cement under the title of the Ta Hu Cement Co. The capital of the company is $2,500,000, and the machinery has been ordered.

The promoters of the company have already subscribed two-thirds of the capital, and the company has been registered in Peking. Between 200 and 300 *mow* of land have been bought, it is stated, to the south of the city, lying on the Grand Canal.

Among the promoters are prominent members of the Wusih gentry. The names of Mr. Sih, Mr. Yung and Mr. Yang are among the members, and Shanghai capitalists are also said to be interested.

Lime and silica may be had in great quantities at reasonable distances from the site of the plant, and the water communications over which the material must be brought are good. For the disposal of the finished product, Wusih offers unusual rail and water facilities for transportation.

Atlas Plant at Ilasco Electrified

Electrification of Plant No. 5 of the Atlas Portland Cement Co., at Ilasco, Mo., is well under way.

Preliminary work is now in progress for the substitution of electric current from the Mississippi River Power Co., at Keokuk, Ia., for the steam generated power which has been in use at the plant. When completed the entire cement plant will be electrically operated by power generated from water of the Mississippi river at the Keokuk dam, 70 miles away. Plant No. 6, which is in the same locality, was electrified in 1915.

Three large line shaft motors will be installed to drive the rock mill, the coal mill and the clinker mill of Plant No. 5. The equipment will be similar to that of No. 6, where five motors were installed. The Atlas officials are making this move not only for efficiency and economy, but believe that more power will be possible than from steam engines. Since the electrification of No. 6 in 1915, the Atlas has had very satisfactory service with the installation.

Motors and other material have been ordered and preliminary work is now under way, according to R. E. Hoffman, superintendent of the Ilasco plant, which is the largest plant owned and operated by the Atlas corporation.

Demand for Cement in the South

There is every indication that there will be a demand for cement this year in the Southern states that will use all that the local mills can produce, according to a report from Alabama. A full capacity of operation of cement plants is looked for, as business has already opened up in a very satisfactory manner.

The Alabama cement mills supply Alabama, Mississippi, Georgia, Louisiana, Florida and Tennessee. The three leading Alabama mills are the Atlas mill at Leeds, The National, at Ragland, and the Gulf States at Demopolis.

Negotiations are under way for a new plant at Village Springs near Birmingham, Ala. Suitable materials for the manufacture of cement are available in that locality. It is also reported in Birmingham that plans are being considered by the Lehigh Portland Cement Co. for the construction of a large cement plant at Tarrent City, a suburb of Birmingham.

Practically all the cement plants in the territory are being operated on full time, the Atlas plant at Leeds, Ala., producing 3,500 bbls. of cement per day.

At the annual meeting of the Directors of the National Slag Association, held January 28 at the offices of that organization at 933 Leader-News Building, Cleveland, Ohio, the following officers were elected for the coming year: President, L. A. Beeghly, Standard Slag Co., Youngstown, O.; vice-president, C. E. Ireland, Birmingham Slag Co., Birmingham, Ala.; secretary-treasurer, H. J. Love, Cleveland, O. The members of the Executive Committee for 1922 will be: L. A. Beeghly, Standard Slag Co., Youngstown, O.; E. H. Kuttner, Illinois Improvement & Construction Co., Chicago, Ill.; C. L. McKenzie, Duquesne Slag Products Co., Pittsburgh, Pa.; L. H. Hawblitz, France Slag Co., Toledo, O.; H. N. Snyder, Buffalo Slag Co., Buffalo, N. Y.; J. M. Truby, Cleveland Builders Supply & Brick Co., Cleveland, O.

Cement Prices in Middle West

The cement situation in the Middle West was partly cleared up with the opening of new bids on February 28 by four states, Illinois, Wisconsin, Michigan and Indiana. The requirements of the four states totaled nearly 6,900,000 bbls. The Marquette Cement Mfg. Co., with mills at LaSalle, Ill., bid on a base price of $1.30 on a quantity restricted in the bid to 600,000 bbls. each for Illinois and Wisconsin. The State of Illinois has awarded the Marquette company a contract for furnishing the 600,000 bbls. All other bids in excess of the Marquette company's bids were rejected and new bids asked later.

The Louisville Cement Co.'s bids in Indiana were based on both steam road and electric line deliveries to certain points. The price for deliveries over the interurban lines was less than the price quoted by the Marquette company for steam road delivery at the same points. Several smaller mills in Michigan bid on furnishing limited quantities at prices less than the base rate price of the larger mills, thus taking advantage of their locations near the delivery points for the cement to be used by that state.

In submitting a bid to the Illinois State Department of Public Works and Buildings, opened March 24, on cement for use in construction of state highways, the Universal Portland Cement Co. sent the following letter dated March 23:

> In response to your advertisement for bids to be received March 24, we submit herewith proposal on Universal cement for use in the construction of state highways.
>
> The delivered prices specified, after deduction of cash discount and freight charges from our mill to destination, net us not over $1.50 per barrel.
>
> This price is 48½% higher than our average mill price during the pre-war year, 1913. The latest report of the U. S. Department of Labor shows the January price of "all commodities" as 48% higher than 1913.
>
> The principal elements in our manufacturing costs are coal, limestone, freight rates and labor.
>
> Our cost of coal at mines in February, 1922, was 203% greater than in 1913.
>
> Our cost of limestone at quarries in February was 60% higher than in 1913.
>
> Our wage scale in February was 54% greater than in 1913.
>
> About 1¾ tons of raw material and coal are required to produce one ton of cement.
>
> Freight rate on coal in February was 107% greater than in 1913.
>
> Freight rate on limestone in February was 52% greater than in 1913.
>
> Please compare these increases cited above with the increase in price of Universal cement of 48½% and the increase in price of all commodities of 48%.
>
> In view of the foregoing we trust that you will accept our bid. We stand ready to furnish you with cement in the quantities and at the times you want it, subject to the conditions of our bid, and if given the opportunity, will give you the best of service in our power.

Michigan Mills Appeal Freight Rate

Michigan cement mills have linked their appeal with other large consumers of bituminous coal in that state for lower freight rates. In common with iron and paper mills, the Michigan, Newaygo, New Egyptian, Peerless, Peninsular, Petoskey and Wolverine Portland Cement Companies, ask the Interstate Commerce Commission in their complaint against the railroads to find that the rates on coal to Toledo, O., are the measure for the rates from the Ohio and Crescent mines to Michigan points.

It is asserted that the present rates to Jackson and to the mills in the Jackson, Lansing, Kalamazoo, Grand Rapids, and Petoskey groups are arbitrarily made and bear no proper relation to the rates to Detroit and Toledo and consequently discriminate against the Michigan plants in preference of competitors nearer to the mines, besides being unreasonable per se. It is stated that violation of the long and short haul provision of the Interstate Commerce Act at Cement City, Chelsea and Jackson, Michigan, by the New York Central is illegal and would be eliminated with a proper adjustment of the Detroit-Jackson rates.

American manufacturers and business men who attend the Ninth National Foreign Trade Convention in Philadelphia May 10 to 12, inclusive, will not only rub elbows with foreign traders from all parts of the globe, but will have the benefit of information and advice on their individual problems of selling their products abroad, no matter how new or remote the markets, according to the information division.

In co-operation with the Trade Adviser Service, always a valuable feature at these National Foreign Trade Conventions, the U. S. Department of Commerce will have a large delegation of its experts on hand. Secretary of Commerce Hoover and Julius Klein, Director of the Bureau of Foreign and Domestic Commerce, are taking an active personal interest in the convention and both expect to be present. The heads of the various commodity divisions of the Department of Commerce, and representatives of foreign divisions of the Department of State will also attend the convention, which will bring together thousands of the keenest business minds of the country to stimulate American foreign trade.

In addition to his own experts, Secretary Hoover has asked the heads of the largest and most important manufacturing and commercial concerns of the country to detail their most capable men with first hand knowledge of market conditions abroad to attend the convention and co-operate with the Department of Commerce representatives.

International Cement Co. earned $4.30 a share last year, according to preliminary report, on 324,693 common shares outstanding. This compares with $6.63 a share earned on 268,139 in 1920, says the *Wall Street Journal.*

Figured on the 1920 capitalization net income last year of 71,457,880, after charges and taxes, was equivalent to $5.44 a share.

Officials regard the showing as satisfactory. Unfavorable business condition prevailed throughout the year and the corporation did not receive any income from Knickerbocker Cement, acquired in the summer of 1921. Expense of readjusting and remodeling the Knickerbocker plant to bring it up to International's standard was charged against third and fourth quarter earnings. Cement business usually falls off in the winter.

Earnings are increasing now that returns are being received from Knickerbocker Cement. Officials say this plant alone should roll up big profits, and look forward to better earnings than were returned in 1921.

They point out that building permits show a large increase over 1921 and construction in this country last month was 73% over February, 1921. Road building also shows a substantial expansion.

It is expected that a big cement business will be transacted in Cuba this year, also in Argentina and Uruguay. International has plants in these countries, also in Dallas and Houston, Texas.

Men and Mills

Notes from the Field

George Sykes, secretary of the Lehigh Portland Cement Co., died of heart failure January 24 at his home on Hamilton street, Allentown, Pa. He is survived by his wife, Mrs. Sarah Grube Sykes. His only son died in Winchester, England, while in training for service in the world war.

Conditions have arisen delaying somewhat the starting of actual construction of the cement plant which is to be erected by the South Dakota Cement Commission. It is anticipated that construction progress will be made early in the spring.

The members of the National Lime Association are developing plans for the next annual convention, which will be held at the Hotel Hollenden in Cleveland, probably the 14th to the 16th of June.

John A. Lynn, aged 55 years, of Coplay, died at his home. Death was due to heart trouble.

Mr. Lynn was born at Chapman's Quarries, the son of the late John and Mary Lynn. At the age of six years his parents moved to what was then called Saylor, Pa., where he attended the Whitehall schools at Coplay, then held in the present town hall. At the age of 11 yrs. he began work as a brickmaker at the Coplay Cement Manufacturing Co.'s plant. From that position he worked his way to the office of superintendent, severing his relations with the company at the end of nineteen and one-half years.

The plant of the Bonner Portland Cement Co. was started in operation on February 20. Extensive repair work was done while the plant was shut down.

Howard Betts, formerly of Catskill, N. Y., and engineer on J. P. Morgan's yacht Corsair, has accepted the position of chief engineer at the Alpha cement plant at Cementon.

The wedding of Miss Leslie Somers and Donald Watt of Catskill, N. Y., was announced on March 25. Mr. Watt is treasurer of the Acme Cement Corporation.

Alonzo F. Walter, treasurer of the Lehigh-Portland Cement Co., has been elected to fill the office of secretary made vacant by the recent death of George Sykes. Gen. C. T. O'Neill, of Allentown, Pa., has also been elected assistant secretary of the company. These changes made by the board of directors became effective in February.

Fourteen aliens of the Lehigh cement region recently left for their native homes in Austria. Several of the men may return but most of them expect to remain in Austria.

The severe industrial situation is probably responsible for the departure of many foreigners, and the numbers returning may increase unless working conditions revive.

The quarrymen of the Alpha cement plant, New Village, N. J., are now on the job tearing away what remains on the surface of the Gibraltar rocks that lie close to the Delaware river banks.

A trial which began in the Hudson county court at Jersey City, N. J., recently brought out the story of a plot that had been laid to kill a paymaster of the Alpha Portland Cement Co. while he was on his way from Easton to Martin's Creek, to pay the company's employes.

At a meeting of stockholders of the Lawrence Portland Cement Co. at Northampton, about twenty-five stockholders were in attendance. Among them were Frank Smith, of New York, president; M. S. Ackerman, Sr., of New York, vice-president; C. A. Porter, Allentown, vice-president; J. S. Van Middlesworth, New York, secretary; M. S. Ackerman, Jr., New York, assistant secretary, and Mr. Buxcon and Mrs. Rushmore, both of New York City, directors.

William H. Mann, of Allentown, paymaster and head of the insurance department of the Lehigh Portland Cement Co., and its oldest employe in term of years, died suddenly on February 28, of acute indigestion. He was 59 years of age.

Officials of the cement plants in Bath and Nazareth, who are interested in all welfare and social activities among their employes, also advocated athletics. During the past winter a basketball league with teams representing the Hercules, Dexter, Pennsylvania and Bath Portland Cement mills, was organized. In the first games played the Penn-Allen team defeated Bath and the Hercules five won from Dexter. The games were played on the Nazareth "Y" floor.

L. L. Woodward, chief chemist of the Oregon Portland Cement company, died suddenly at his home in Oswego on Feb. 22. Mr. Woodward has been very prominent in the welfare of the young people of Oswego, having organized both the Boy Scouts and the Girls' club. He left Oswego to go into the service in the late war and joined the Y. M. C. A. war organization and was stationed as a secretary at Camp Lewis.

As a result of a conference held between Colonel William Hayward, as the representative of the government, and Colonel Henry L. Stimson, Charles E. Hughes, Jr., Sylvester R. Cox, and other lawyers representing the defendants, Judge John O. Knox in the Federal District Court set the trial of the eastern cement manufacturers for April 4, according to the *New York Evening Journal.* The indictment charges the corporations and individuals mentioned in it with violating the Sherman law, in connection with the manufacture and sale of cement.

The plant of the New York and New England Lime and Cement Co., at Greenport, N. Y., started in full operation on February 16 with about 500 men under B. E. Miller, superintendent, after having been closed since holiday time. Considerable repair work has been done on the machinery.

The first trainload of marl of the season for the plant of the Peerless Portland Cement Co., was received in February from Spring Arbor, Mich. Clay was also being brought to the plant from the pits south of Quincy.

The Limestone Products Corp. of America, Newton, N. J., has about completed arrangements for the erection of a 10,000-ton concrete silo storage for pulverized limestone.

The Phoenix Portland Cement Co., Nazareth, Pa., has about closed all contracts for the erection and installation of a complete crushing plant, having a capacity of about 200 tons per hour.

Heavy water shipments were made from Bellingham, Wash., by the Olympic Portland Cement Co., these totaling 54,945 barrels or 10,437 tons of cement. Of this 43,220 barrels were shipped to Mud Bay, Wash. The other destinations, with their totals in barrels, were: Honolulu, 3600; Alaska, 2422; Fort Worden, 399; Port Angeles, 4700; Roche Harbor, 63; Seattle, 530.

The California-Oregon Power company has just placed an order with the Beaver Portland Cement Co., for 10,000 barrels of cement. This is approximately a $40,000 purchase and will require 50 freight cars to deliver at Thrall, Cal., where it will go over the power company's 14-mile railroad to Copco, where the company is installing the second 12,500-kilowatt unit, and also raising the crest of the dam across the Klamath river to its full height of 130 feet above the former water level.

Making of the cement for this order is now under way.

At the Ceramic Experiment Station of the Bureau of Mines, Columbus, Ohio, a study of electric furnace refractories is to be undertaken. A study is to be made of the development of these refractories and the measurement of their electrical conductivity at different furnace temperatures. The investigation will probably consume more than a year's time.

Super-refractories should be burned at the highest possible temperature. The electric furnace would be highly desirable. Electric furnaces of various designs will be built at the Northwest Experiment Station of the Bureau of Mines at Seattle, Wash., and used in burning super-refractory shapes.

Texas cement plants announced a reduction of 15 cents a barrel on cement on Feb. 15. The new rate is $2.65 f. o. b. plant, including sacks.

F. R. Bissell, of New York, chairman of the board of the International Cement Corporation, spent a week in Dallas recently, inspecting Texas plants.

At the annual meeting of stockholders of the Petoskey Portland Cement Co. in February it was voted to increase the capital stock of the company to $2,500,000. According to information given out in Petoskey, the new stock will be allotted to present stockholders. Some of the new funds will be expended in the erection of additional buildings at the plant, including a material stock building and cement stock house. Immediate work on the new buildings was planned.

At the annual meeting of the stockholders of the Monarch Cement Co. held on February 7, the old board was re-elected with the same officers as before. The stockholders of the company were eye witnesses to the many improvements made since the reorganization of the plant. From the producers' standpoint, the efficiency has been greatly increased, in fact, the cost of producing has been cut in half. The storage capacity was increased, by the construction of several concrete silos.

What is considered the greatest achievement is the waste heat boiler installation. All improvements were heartily approved by the stockholders.

The San Antonio Portland Cement Co. was running during the winter at half its capacity. The plant has a daily capacity of about 2,000 barrels.

The Texas Portland Cement Co., Houston, has just completed a new kiln and is operating as a two-unit plant instead of a one-unit plant. Its capacity has been increased from 1,100 barrels daily to 2,200 barrels daily. It is announced the new plant is operating with 100% efficiency.

The Trinity Portland Cement Co., Dallas, shut down Feb. 1 on account of the heavy stock on hand. Although the plant has been shut down none of the force has been laid off and the company is preparing for a heavy summer run.

The Newala Lime Works is just completing an up-to-date hydrating plant with new machinery throughout and as soon as it is running smoothly one or more kilns will be added.

The Interstate Lime Corp., which has been closed down for 18 months contemplated resuming operations about March 15. A new crusher and other equipment will be installed.

E. M. Confer, former superintendent of the Gulf States Portland Cement Co., and with which company he is still connected in a consulting capacity, is now in charge of the O'Neals Lime Works at Eureka, Ala. The new development will include a 1500 barrel burned lime plant and a 500 ton rock crushing plant. Twelve steel jacketed kilns will be installed, each having a capacity of 136 barrels. The year started out in a very satisfactory manner for the company. On the average, three cars of lime per day have been shipped since the first of January. The future of hydrated lime is considered very bright in that section of the South.

The Interstate Commerce Commission has suspended until June 29 proposed increased rates on lime and lime rock, in carloads, from Mosher and St. Genevieve, Mo., to certain points in Michigan, Wisconsin and Minnesota. These schedules were to become effective March 1. The present and proposed rates in cents per 100 lbs. from Mosher and St. Genevieve to Midland, Mich., are 21½ and 30, respectively; Madison, Wis., 24½ and 29; Portage, Wis., 22½ and 30; Maysville, Wis., 25 and 27; Masinee, Wis., 25½ and 30, and Red Wing, Wis., 28½ and 35.

A newly developed dynamite which, it is announced, will prove an important factor in reducing explosive costs in quarrying and other open work has just been perfected by the Du Pont Co.

The new powder is known as Dumorite and is made with a double base of modified nitroglycerin and guncotton. It cannot freeze and does not produce headache, according to the Du Pont Co.

Another level at a depth of 7 ft., eventually to be 14 ft., is being made at the limestone quarry of the Louisville Cement Co. This depth is to be carried over to the one that was abandoned and within 3 mos. the third step of 7 ft. will be made. This will give a quarry face of 21 ft.

After a depth of 21 ft. is attained the quarry crew expects to deliver 140 loads of limestone in 9 hrs.

George E. Dickinson, who has been purchasing agent and shipping clerk of the Superior Portland Cement Co. for a number of years, has resigned to accept the position of sales manager of the cement department of the Pioneer Sand & Gravel Co. of Seattle. Mr. Dickinson will be succeeded as purchasing agent by W. J. O'Connell. The work of shipping clerk will be handled by Richard N. Dubigk, who will have charge of the sacking department and will look after all transportation matters for the company.

At the annual meeting of the stockholders of the Alpha Portland Cement Co., President G. S. Brown submitted his annual report, which showed a successful year and prospects for brighter conditions in the cement industry.

The following directors were elected: James H. Lockart and J. M. Lockart, of Pittsburgh; Louis H. Porter, New York City; G. S. Brown and Frank G. McKelvey, Easton; F. M. Coogan, Phillipsburg, N. J., C. K. Boettcher, of Denver, Col.; C. H. MacNider, of Mason City, Iowa, and C. A. Irvin, of Chicago, Ill. C. H. MacNider is the father of Hanford MacNider, National Commander of the American Legion.

The directors organized by electing G. S. Brown, president; Frank G. McKelvey, F. M. Coogan and C. A. Irvin, vice-presidents; John J. Matthes, of Phillipsburg, treasurer; F. G. Lyons, Easton, assistant to treasurer; R. S. Gerstell, Easton, secretary; W. E. Viets, Chicago, Ill., assistant secretary and assistant treasurer.

Floyd H. Compton, formerly with the Portland Cement Assn., Chicago, Ill., is now at the Speeds mills of the Louisville Portland Cement Co.

Stockholders of the Glens Falls Portland Cement Co. voted at the annual meeting to increase the capital stock of the company from 600,000 to $1,200,000.

Plans are being made for extensive improvements, including a large storage building and a new crushing plant. The plant has been working through the winter season and large quantities of cement are now being stored.

The former officers were re-elected.

S. H. Dewson, engineer for the Conservation Committee, Portland Cement Association, has spent about a month with the Louisville Cement Co. at Speeds, Ind.

Mr. Dewson was formerly construction engineer for the Whitehall Cement Mfg. Co. at Cementon, Pa., and served in that capacity for about nine years.

While at the plant of the Louisville company he expects to make several tests on the tube mills in the finishing room to find out just how much the production is cut down when cement is ground finer than the standard specifications call for. He will also endeavor to find out just how much power it is taking in each department to make one barrel of cement.

At the recent annual meeting of the stockholders of the Peerless Portland Cement Co., an annual dividend of 8% was declared and the affairs of the company were reported in a very satisfactory condition. The newly elected officers are Wm. M. Hatch, Battle Creek, as president and general manager; John Gillespie, Detroit, as vice-president, and Fred H. Panzer, Detroit, as secretary and treasurer.

The plant is again in full operation and a highly satisfactory season is anticipated. The factory was shut down only 6 wks. and in this interim there was much new machinery installed. These changes insure more perfect combustion of fuel and a largely increased output of clinker. It is noticeable, also, that the improved combustion has resulted in less objectionable waste from the stocks. Heavy shipments of cement have continued all winter to a degree never before experienced in that factory, and the storage bins contain less seasoned cement than ever before at this time of year. It is expected the output this year will be the largest in the history of the concern.

The management of the Peerless company is public-spirited and interested in highways. During the past winter one of the big trucks with snow-plow attached has been used to keep the road between Union City and Battle Creek free from snow. With the advent of spring the company has also sent out a truck with scraper attached to smooth down this same highway.

A 10% cut in wages was announced about March 15 at the plant.

The Universal Portland Cement Co. at Buffington, Ind., began to lay off workmen about the middle of February, starting with a cut of 300 men. The occasion for this reduction was the lack of demand for cement turned out at the plant. Capacity operation had been maintained for some time, giving employment to about 1,300 men, until storage facilities had become taxed to the limit.

The plant of the Oregon Portland Cement Co., located at Carnes, opened in February after having been closed since last November.

The Alpena plant of the Huron Portland Cement Co. has been operating continuously throughout the winter, with no indication at this time of a letup in the near future. Construction is proceeding on the new addition to the plant.

Furnishing employment to 300 men, the Concrete, Wash., plant of the Superior Portland Cement Co. resumed operation February 20. For three months it had been idle, during which time repairs and improvements were made.

Howard H. Leh, general superintendent, Phoenix Portland Cement Co., Nazareth, Pa., was elected a director on the board of the Limestone Products Corporation of America, at a meeting held in the office of the company at Newton, N. J.

A new form of report is being filled out by each department throughout the plant of the Louisville Cement Co., showing the hours lost by each machine, thus making it possible to find out how many barrels per hour the equipment is turning out. The Portland Cement Association has information on what similar equipment is doing at other company's plants throughout the country and the results at the Louisville plant will be compared with these figures.

The New Egyptian Portland Cement Co., which has a plant at Fenton, Mich., has issued a long-term lease of the former Grand Trunk car shops at Port Huron, Mich., which have been idle for some time. The plant will be remodeled for the manufacture of cement. The company also has a lease of 1,200 ft. of river frontage and will be able to unload stone from boats into the plant with one operation, and to load cement the same way for water transportation.

The annual meeting of the Wolverine Portland Cement Co., held at the company offices at Coldwater recently, was well attended.

The financial report showed the company to be in an exceptionally good condition. During the past year only the Coldwater plant has been in operation, the Quincy plant having been idle.

Beginning as early as possible in the spring both plants will be run to capacity. An order was recently received from Sturgis for 30,000 barrels of cement. The outlook for the coming year is the best in many seasons.

The following directors were elected: J. B. Branch, F. H. Flandermeyer, L. E. Rose, A. E. Robinson, C. C. Jones, B. B. Gorman and E. D. Legg.

The directors elected the following officers for the coming year: C. C. Jones, president; A. E. Robinson, vice-president, and P. A. Sweeney, secretary and treasurer.

The output for the past year was 313,930 barrels which is about double the amount produced in 1920.

Frank Murray, of Coldwater, who has been mechanical engineer of the Coldwater factory, will be in charge of the Quincy plant.

At present a force of men is busy making repairs at the plant, and it is expected more will be added.

John Smallshaw, Jr., has taken the position of draughtsman at the Coldwater plant, made vacant by the removal of F. W. Murray to Quincy, where he will be assistant superintendent.

Plans are being made under the direction of B. J. Latimer, superintendent, to start full operation at the Nebraska Cement Company's plant early in April. Since early winter a part shift has been working on repairs and installing new equipment. With the new compeb mills driven by two 400-horsepower motors it is anticipated that former difficulties will be overcome. From eight to twelve cars are being loaded out daily.

The first annual conference of salesmen for the Sandusky Cement Co. was held at the home office in Cleveland in January, with an attendance of about twenty, constituting the company's field representatives in all territories.

Important details involving policies in merchandising and selling, technical matters, routing and shipping, etc., were thoroughly covered, to the mutual benefit of both executives and salesmen. The conference closed with an elaborate banquet tendered the men by the company at the Hotel Cleveland.

The executives of the Sandusky Cement Co. are: S. B. Newberry, president and general manager; W. B. Newberry, assistant general manager; E. J. Maguire, treasurer; C. B. Rogers, general sales manager.

Herbert S. Smith, of Northampton, died at his home March 8, following a week's illness with typhoid fever. He was employed at the Lawrence Portland cement plant at Northampton as foreman millwright.

The Antrim Lime Co., Petoskey, Mich., reports that while 1921 was a very poor year for business, with a demand for only about one-third of the company's output, the new year has started in very encouraging.

The Hercules Powder Co. has reduced its prices on high explosives and blasting powder, new prices becoming effective February 17th.

Lime burners in northern Vermont, whose product is a hard white lime, high in calcium and more expensive to produce than ordinary lime, used chiefly in the so-called chemical arts, have had very little business during the past year, owing to the slack condition in the paper, leather and kindred trades. The decreased market in building lime, though not effecting them directly, has indirectly resulted in offers of such lime to the chemical trade at below the market for chemical lime, in some cases to the further reduction of the chemical lime business.

The Hopkinsville Lime Works, Hopkinsville, Ky., has discontinued business, sold its land and dismantled its plant.

From every standpoint the cement plant district safety meeting held at the Statler Hotel, in St. Louis, February 13, was undoubtedly the most successful meeting of its kind ever held. All member companies in the Mid-West and South were invited to take part, and although several failed to make use of this splendid opportunity for getting more information and developing new ideas in safety work, those present profited by the extraordinary enthusiasm created in this meeting.

J. C. Josse, superintendent of the Continental Portland Cement Co., acted as chairman.

A marked reduction has been made in the number of permanent disabilities in the cement industry within the last two years, according to the *Accident Prevention Bulletin* of the Portland Cement Association. The study of accidents for 1920 showed that 72 member company plants had 82 permanent partial disabilities. For the year 1921 the same plants had 33 permanent partial disabilities. This is a reduction of 60%.

The West Branch Lime Co., Williamsport, Pa., reports that the lime business has been very quiet since October 15th. Fuel is high, freight very high, and farm products low and not moving. All indications are favorable for some business during the spring months, but the company does not hope for any material improvement until freight rates are lowered.

The quarry, rock crushing, clay drying and raw grinding departments of the Northwestern States Portland Cement Co., Mason City, Iowa, started work March 13. Men are being put to work in increasing numbers.

In starting the plant after a complete shut down, certain departments are started first, the others taking up work as the product in its partially finished state is carried to the storage tanks. This process takes from 18 hours to three or four days, depending on the condition of the tanks throughout the plant. In view of the long tie-up this year, the storage bins, are practically all empty.

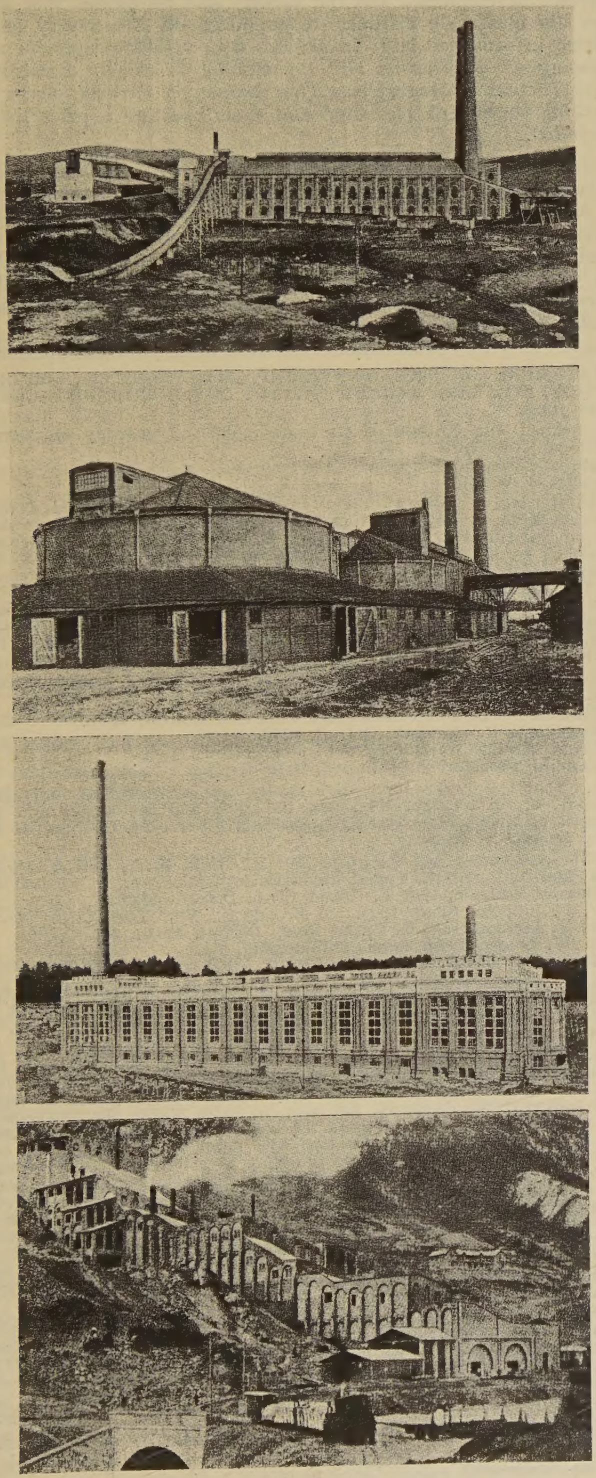
Individual motors for the kilns installed during the past winter are practically all in running order.

Different Apperance of Foreign Cement Plants

By E. Lee Heidenrich

On the occasion of the fortieth anniversary of the well known Danish firm, F. L. Smidth & Co., *Ingenioren* illustrates a number of achievements by this contracting firm, and among them cement mills, of which are here shown some of the most interesting to American readers:

Fig. 1—Cement plant at Felsogalla, Hungary; Fig. 2—Cement mill at Petrograd, Russia; Fig. 3—Pargas cement plant, Finland; Fig. 4—The cement plant, "Ashland," near Barcelona, Spain.



Figs. 1 to 4—Showing Different Appearances of Foreign Cement Plants

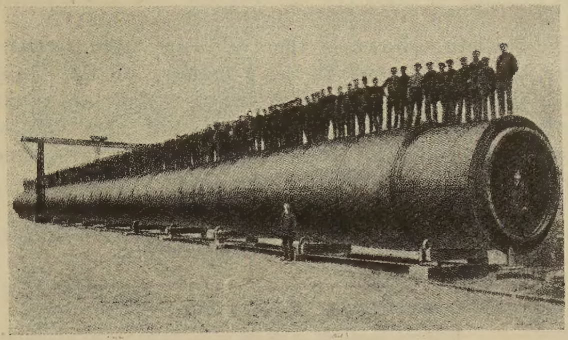


Fig. 5—Rotary Kiln 247½ ft. long for Foreign Plant

The architectural features and the picturesque effect in these designs are noticeable. The gravity principle displayed in the layout of the Barcelona design will appear familiar to our designers of gold, silver or copper mines in the U. S.

Fig. 5 shows a 247-ft. 6-in. rotating kiln built by the same contractors. The firm has factories at Valby, Denmark; Lubeck, Germany; Luton, England; in Narva, Esthland, and in Elizabeth, N. Y., U. S. A.

Cement and Lime Dust vs. Tuberculosis

Dr. Richard Franz in *Tonindustrizeitung* states that careful research by Professor Roessle, Director of the Pathological Institute of the University of Jena, and others, have resulted in finding that workmen in cement plants and lime kilns in no way are exposed to tuberculosis by breathing air containing great quantities of silicic acid or lime, such as has been thought and preached formerly. On the contrary, it was discovered that the breathing of mineral dust in most instances was beneficial to tuberculosis patients among the workmen, strengthening and healing the affected lungs.

Dust Abatement in Cement Mills

According to *Tonindustriezeitung*, the use of electricity as a means of laying or preventing dust is of particular advantage in Germany, where the dust is hurtful to the surroundings or where the dust itself contains valuable particles.

It is stated by L. Platz that there are in Germany some 30 plants with an effective capacity of about 1,710,000 cubic meters per hour, and about 20 more installations are under construction.

Metalbank und Metallurgische Gesellschaft Akt.-Ges. in Frankfurt A. M., and Erwin Moller in Brackwede are to be credtied for the introduction of electrical dust abatement in Germany.

Imports of Cement Into Honduras

British consular reports state that cement is offered cheaper from Belgian ports than from the United States in spite of the lower freight to the capital, Tegucigalpa.

Portland Cement Output in February

The statistics shown in the following table, prepared under the direction of G. F. Loughlin, of the United States Geological Survey, are based mainly on reports of producers of portland cement but in part on estimates. The estimates for February were made necessary by the lack of returns from three producers.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT IN FEBRUARY, 1922, AND PRECEDING MONTHS

Month	Production (barrels)		Shipments (barrels)		Stocks at end of month (barrels)	
	1921	1922	1921	1922	1921	1922
January	4,098,000	a4,291,000	2,539,000	a2,931,000	10,300,000	a13,316,000
February	4,379,000	4,278,000	3,331,000	3,285,000	11,400,000	14,310,000
March	6,763,000	- - - -	6,221,000	- - - -	12,000,000	- - - -
First quarter	15,240,000	- - - -	12,091,000	- - - -	- - - -	- - - -
April	8,651,000	- - - -	7,919,000	- - - -	12,600,000	- - - -
May	9,281,000	- - - -	9,488,000	- - - -	12,450,000	- - - -
June	9,296,000	- - - -	10,577,000	- - - -	11,150,000	- - - -
Second quarter	27,228,000	- - - -	27,984,000	- - - -	- - - -	
July	9,568,000	- - - -	10,301,000	- - - -	10,414,000	- - - -
August	10,244,000	- - - -	12,340,000	- - - -	8,280,000	- - - -
September	10,027,000	- - - -	11,329,000	- - - -	6,951,000	- - - -
Third quarter	29,839,000	- - - -	33,970,000	- - - -	- - - -	- - - -
October	10,506,000	- - - -	12,114 000	- - - -	5,348,000	- - - -
November	8,921,000	- - - -	5,195,000	- - - -	9,091,000	- - - -
December	6,559,000	- - - -	3,697,000	- - - -	11,938,000	- - - -
Fourth quarter	25,986,000	- - - -	21,006,000	- - - -	- - - -	- - - -
	98,293,000	- - - -	95,051,000	- - - -	- - - -	

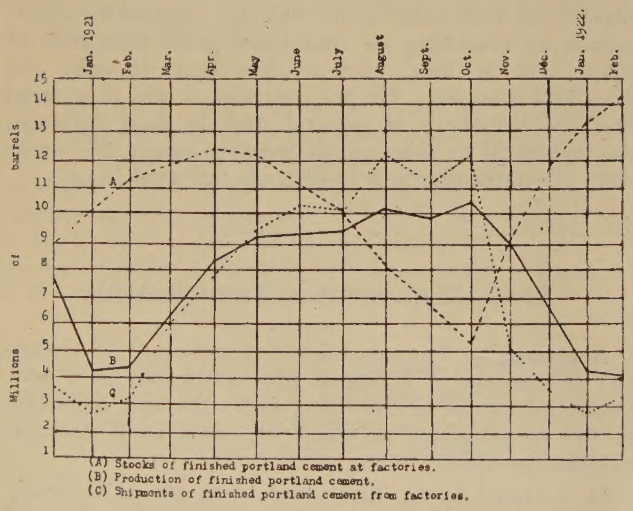
(a) Revised.

IMPORTS AND EXPORTS OF HYDRAULIC CEMENT IN FEBRUARY, 1922, AND PRECEDING MONTHS (a)

Month.	Imports (barrels)		Exports (barrels)	
	1921	1922	1921	1922
January	14,678	17,036	225,561	70,725
February	18,269	5,157	84,230	82,421
March	7,631	- - -	97,302	- - -
April	1,540	- - -	93,009	- - -
May	2,035	- - -	82,409	- - -
June	1,657	- - -	100,831	- - -
July	3,455	- - -	81,091	- - -
August	10,988	- - -	84,538	- - -
September	5,177	- - -	84,668	- - -
October	11,448	- - -	79,871	- - -
November	20,112	- - -	71,214	- - -
December	25,327	- - -	96,290	- - -
	122,317	- - -	1,181,014	- - -

(a) Compiled from records of the Bureau of Foreign and Domestic Commerce.

MONTHLY FLUCTUATIONS IN PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT



The Bureau of Foreign and Domestic Commerce, of the Department of Commerce, reports that imports of hydraulic cement in February amounted to 5,157 bbls., valued at $9,304; the total for 1921 was 122,317 bbls., valued at $388,828. The imports in February were from Denmark, 4,319 bbls.; Japan, 758 bbls.; other countries, 80 bbls. The exports of hydraulic cement in February were 82,421 bbls., valued at $240,207; the total exports in 1921 were 1,181,014 bbls., valued at $4,276,986. The exports in February went to Cuba and the other West Indies, 37,401 bbls.; South America, 16,171 bbls.; Mexico, 7,517 bbls.; Central America, 14,796 bbls.; Canada, 513 bbls.; Philippine Islands, 5,000 bbls.; other countries, 1,023 bbls.

Trade Publications

The Deschanel Cableway Bulletin, by the Deschanel Engineering Corporation, New York City, 8½ in. by 11 in., 8 pp.; paper cover, illustrated. This bulletin describes a single line cableway for handling materials such as coal, etc. The materials can be unloaded direct from railroad cars or barge into storage and reclaimed again for further transportation to the power house, and ashes can be removed from the boiler room to cars or storage pile. Tables for finding the weight of coal in piles are included in the bulletin.

Big Blast Hole Drills—Catalog B-45, by the Sanderson Cyclone Drill Co., Orrville, Ohio. This catalog is 8 in. by 10½ in., paper cover, 96 pp. The subject of the big blast hole drills and their application to quarry, open pit mining and heavy rock excavation is treated in the catalog. The big hole method of drilling and blasting is discussed from its origin to the present development, and the factors and conditions that govern big blast hole drilling are enumerated. Some very interesting information is given in regard to size, arrangement and spacing of drill holes, and the catalog is clearly illustrated from actual photographs. The company's various pieces of drilling equipment are listed and described and a price list is included.

Junior Catalog No. 21—Atlas Valve Co., 282 South St., Newark, N. J. 3½ in. by 6½ in., 20 pages, paper covers.

Atlas, Ideal and Victor reducing valves, pump governors, pressure regulators, hot water tank regulators, control valves and damper regulators are described in Junior Catalog No. 21 just published by the Atlas Valve Co. This little catalog gives complete information—illustrates, describes, lists all sizes and gives prices.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of Cement Mill Edition of CONCRETE, published monthly at Detroit, Michigan, for April 1, 1922.

State of Michigan, }
County of Wayne, } ss.

Before me, a Notary Public, in and for the State and County aforesaid, personally appeared R. Marshall, who, having been duly sworn according to law, deposes and says that he is the General Manager of the Cement Mill Edition of CONCRETE, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—Concrete-Cement Age Pub. Co., Detroit, Mich.
President—R. Marshall, Detroit, Mich.
Managing Editor—Harvey Whipple, Detroit, Mich.
General Manager—R. Marshall, Detroit, Mich.

2. That the owners are (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent. or more of the total amount of stock).

Concrete-Cement Age Pub. Co., 1807 E. Grand Blvd., Detroit, Mich.
R. Marshall, 1807 E. Grand Blvd., Detroit, Mich.
Harvey Whipple, 1807 E. Grand Blvd., Detroit, Mich.
F. F. Lincoln, Room 1205, 115 Broadway, New York City.
R. N. Jackson, 1807 E. Grand Blvd., Detroit, Mich.
R. W. Lesley, Penn Bldg., Philadelphia, Pa.
Edward B. Bruce, Manila, P. I.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities, are: (If there are none, so state). None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers, during the six months preceding the date shown above is ——— This information is required from daily publications only.)

R. MARSHALL,
Manager.

Sworn to and subscribed to before me this 28th day of March, 1922.
(Seal.) IONE MICHAEL.
(My commission expires April 9, 1923.)

EXPERIENCED MILL FOREMAN FOR cement plant in Kansas district. Box 1271, C|o CONCRETE, Detroit, Mich.